Rock Products

With which is Incorporated CEMENT and ENGINEERING NEWS

Founded 1896

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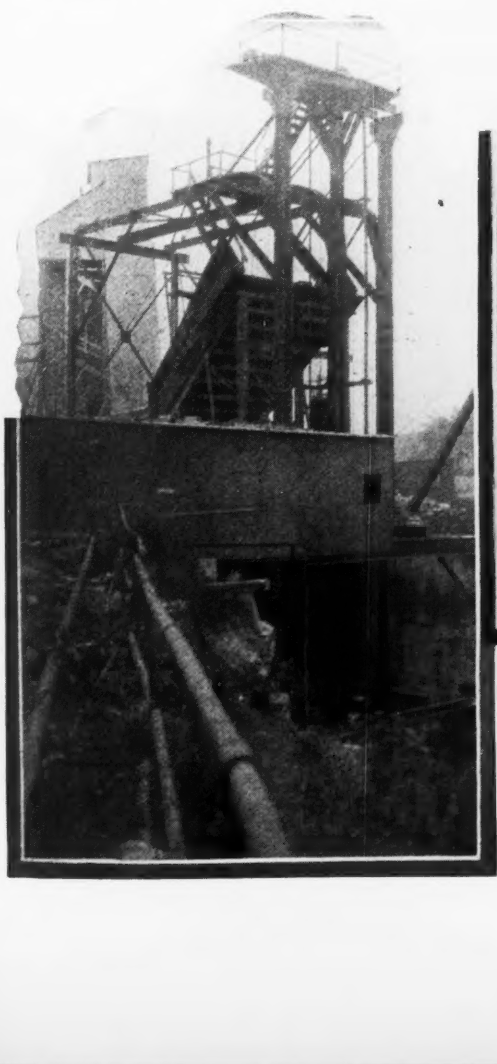
The Rock Products Industries of Montreal, Quebec

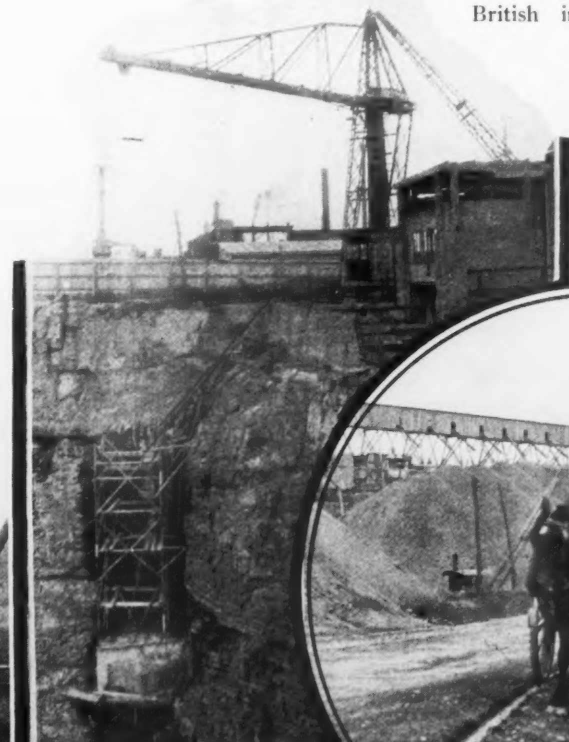
More Than 5,000,000 Tons of Crushed Stone for Aggregate Produced in This City of Quarries Where Gravel Competition Is Negligible

By Walter B. Lenhart
Associate Editor, Rock Products

MONTREAL, the capital of the Province Quebec and the financial and commercial metropolis of Canada, has within its city boundaries probably more rock products industries than any city in North America of similar size. These industries include a multitude of quarries, two cement plants, a gypsum, calcining and wallboard plant, two lime burning operations, sand-lime brick plants, etc. The city with its suburbs has a population of 1,200,000 and ranks seventh in size on this continent. Incidentally, it is the second largest French city in the world by population. The French language is spoken universally and types of French civilization planted there 300 years ago still exist. Other portions of the city are distinctly British intermingled with Canadian and American stock.

The growth of the city has been roughly at the rate of 50,000 people per year, and this with the growing tourist trade from its southern neighbor has undoubtedly stimulated the construction of office



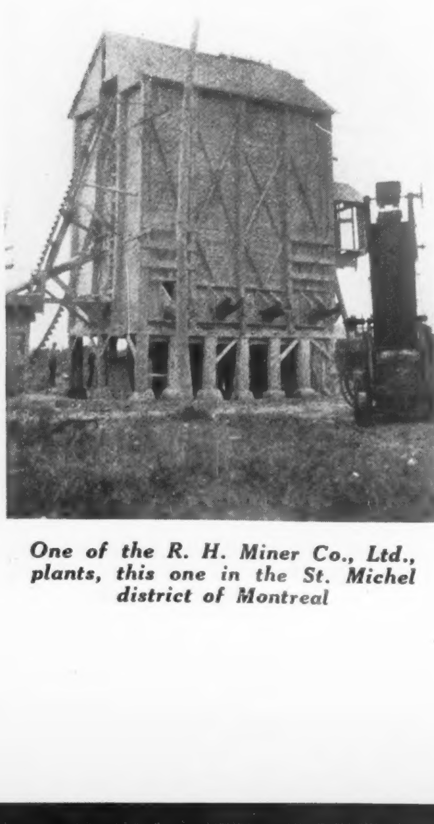


Some unusual quarrying methods in vogue at Montreal. To the left, skip hoist arrangement for elevating raw material in the Villeray operation; center, stiff-leg derricks employed in the Martineau and Fils plant for bringing up skip pans of rock. In the circle, horse-drawn one-ton carts transport rock over iron rails in Morrison Quarry

buildings, hotels, apartments, etc., of a type that compares very favorably with modern construction in the States. New construction work is said to average about $30,000,000 yearly. The city has a large Catholic population, there being listed a total of 250 churches, of which 105 are Catholic, 37 the Church of England and the balance various Protestant denominations. Some of the most stately structures that can be found on this continent are within the city. These include cathedrals, monastaries and schools of various kinds. Several large buildings covering areas almost as large as a city block are at present under construction by various religious organizations. These buildings are of steel and reinforced concrete and are invariably faced with cut granite or similar decorative stone.

A City of Quarries

The most outstanding feature of the city of Montreal, with reference to the rock products industries, is the large number of quarries and crushed-stone plants. I know of no city in the United States that has so many crushed-stone operations per capita as Montreal. There are a total of nine quarries and plants within the city limits, eight just outside the city limits, and in addition there are some five plants and quarries within a radius of 15 to 18 miles of the city that do not, however, ship into the city proper, but serve the territory in their vicinity, making a grand total of 22 crushed-stone operations. The yearly tonnage for these quarries within the above first two groups will range in the neighborhood of 3,255,000 tons of crushed stone and dimension stone. For the outlying group of quarries there could be roughly 2,142,000 tons per year added to the above, making a potential productive tonnage of 5,397,000 tons per year for the entire district. This tonnage, one must bear in mind, also, is based on an operating season of 210 days.



One of the R. H. Miner Co., Ltd., plants, this one in the St. Michel district of Montreal

So one can say that Montreal indeed does have a crushed-stone industry.

Following is a list of the quarries and crushed-stone plants with their approximate productive capacities:

	Capacities per day City (Tons)	Suburbs (Tons)
Martineau and Fils, Masson St. quarry	3,000	....
Martineau and Fils, Morrison quarry	600	....
Montreal Quarry, Ltd.	1,000	....
Union Rock, Ltd.	1,000	....
Villeray Quarry Co., Ltd., No. 1	600	....
Villeray Quarry Co., Ltd., No. 2	1,200	....
Villeray Quarry Co., Ltd., Maisonneuve quarry	3,000	....
Delorimier and Rogers Quarries, Ltd.	600	....
National Quarries, Ltd.	1,000	....
Duquette and Biron	600	....
R. H. Miner Co., Ltd.	200	....
R. H. Miner Co., St. Laurent quarry	....	700
St. Michel Quarry, Ltd.	500	....
Northern Quarry, Ltd.	1,000*	....
Quarries Limited	....	5,000
De Sales Quarry, Ltd.	....	3,000
Laval Quarry Co., Ltd.	....	500
St. Bruno Quarries, Ltd.	....	1,000
St. Laurent Quarry, Ltd.	†	†
Charles Le Pailleur	†	†
Dickson Quarry	†	†
Rockland Crushed Stone Co., Ltd.	†	†
Varin Barbin	1,200	....
Totals	15,500	10,200

*To be built this winter or spring of 1931.
†Not given.

Summary:	Tons per year
15,500 × 210 days	3,255,000
10,200 × 210 days	2,142,000
For crushed stone for aggregate, etc.	5,397,000
For portland cement	1,680,000
Total stone-crushing capacity in the Montreal district	7,077,000

Crushed Stone Man's Heaven!

This large tonnage of crushed stone is sold without competition from gravel producers simply because there is no gravel produced within a distance that would make competition possible. The city is practically 100% a crushed-stone aggregate consuming center. What little gravel does enter, and the sand for building purposes, come mostly from Joliette and vicinity some 50 to 60 miles northeast of the city of Montreal.

General Business Conditions

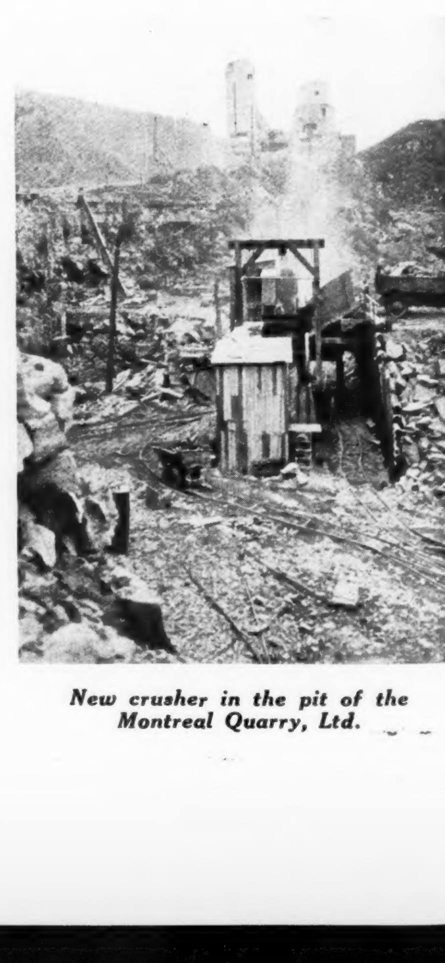
From personal observations made while on an extended trip through Nova Scotia, New Brunswick and Quebec, business conditions generally in Canada are not as bad as were found this spring in the States. Canadian industry is not marked by the sharp rises and falls as we experience them; they are, however, dependent quite considerably on American prosperity, and any depressions that we have are felt in Canada, although the depression period lags behind ours somewhat. We find that while industries in the States are now beginning to work out of their troubles, Canada is just entering hers. The low price of wheat, the uncertainties of the paper industry, the falling off in the lumber industry and the low price of metals have all contributed to the uneasiness that is felt in the Canadian cities and provinces. The daily papers are full of discussions of the problem of unemployment.

At the time this is being written Canada has just passed its new protective tariff laws which so far do not affect any of the rock products industries in the States except those exporting to Canada sodium sulphate, crude salt cakes, magnesite, caustic and calcined or dead burned. These items have been subjected to tariff increases. The general feeling is that these protective tariff laws will stimulate the production of Canadian goods and be a powerful factor in the speedy return of prosperity to the Dominion provinces.

Highway Construction

As Canada with its vast areas and comparatively small population can not stand the financial outlay for highway construction programs such as have saved the industry this year in the States, rock products suffer along with other key industries. Broadly speaking the rock products industries in Canada this year will show about a 25% reduction in volume over last year. The provinces are, however, doing all the highway work that can be reasonably expected of them, considering their ability to pay, yet there remains a world of work to be done.

It will surprise many in the States to know that to date there has not been a single person to travel across Canada in an automobile with the entire trip being made on Canadian soil. To reach the western



New crusher in the pit of the Montreal Quarry, Ltd.

provinces one now has to cross over into the United States for part of the distance. Recently an adventurer started a trek across in a car and expects to blaze his own trail through the western forests and lakes of the province of Ontario through a district that has yet never been crossed in an automobile.

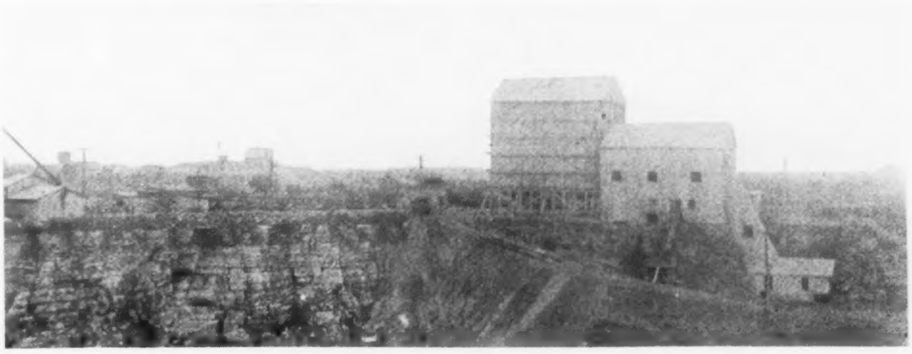
The years 1928 and '29 were probably the best years for the crushed stone industry in Montreal (and for that matter Canada as a whole) with reference to both tonnage produced and prices received. Until within the last year prices in Montreal have been satisfactory with no out-of-the-ordinary price cutting, but recently through the reduction in building and other construction and the increase in the productive capacity of the plant, prices began to weaken until they are now lower than in most cities in the States. The price received at the plants was said to be from 55 to 85c per ton and, as some of the plants are close to the points of delivery it might be said that this price approximates the delivered price also. As several of the operations produce less than 1,500 tons per day, and as a group are not as efficient as they might be made, there is apt to be a weeding out of several of the less efficient operations if present prices prevail for long.

There never has been an association or local organization of producers, but under present conditions interest is being taken in the formation of such an association. There is also talk that some of the companies would merge; one operator stated that if several of the smaller companies would pool their interests with his he would design and build a large tonnage plant that would be the last word in crushed-stone technique.

City Quarries

The first quarries in the city of Montreal were opened up many years ago for dimension or rubble stone, and at that time were located in sections of the city far enough remote from dwellings, as not to excite comment, but still were close enough to make the matter of transportation of the stone to the point of use a matter of small cost. As the city grew some of these old quarries became surrounded with apartments and other dwellings, other quarries became surrounded by sections more industrial in nature.

Today we find two quarries with their crushing plants in operation completely surrounded by apartments and other residential buildings. As a comparison these two quarries are located in a spot, relatively speaking, as close to the downtown section of the city of Montreal as would be the case of a quarry and crushing plant operating in Chicago at Chicago avenue and North Dearborn street, or in New York City at 125th street and Broadway. Naturally the subject of vibrations due to blasting and the experience of United States operators under similar conditions are of extreme interest to these producers.



A view of some St. Michel district operations. The large plant at the right is National Quarries, Ltd., and in the left background can be seen glimpses of the St. Michel, Stinson Reeb, Duquette and Biron, and National Quarries plants

The members of the crushed-stone industry here do not have any scientific way or for that matter any experience whatever with blasting pins for the comparison and recording of earth vibrations due to blasting with the exception of one company, the Villeray Quarry Co., Ltd., which is more or less familiar with the work that has been done by the General Crushed Stone Co. and others. The former company has some records of the intensity of vibrations due to blasting operations, but the three quarries where these investigations have been made are located in districts farther removed from other buildings than is the case in many instances in Montreal.

The city's crushed-stone operations can be grouped into three districts; the downtown quarries that have been previously referred to; the quarries in the vicinity of Iberville and Masson streets, in the easterly part of the city and the third group in the St. Michel district. Those quarries in the second group are all in the industrial section of the city, but still within the city limits, and their continued operation may some day be in jeopardy incidental to blasting, etc. Two of the quarries in this industrial district have their plants directly in line with a proposed new highway or boulevard and the quarry operators expect that soon they will have to move to other locations.

The third and newer quarry district, that of the St. Michel area, is just outside of the city limits and owes its existence entirely to the enterprise of some of the quarry operators who have started small plants there knowing that it would be only a matter of time until those quarries within the city will have to move elsewhere. In the St. Michel district are several new plants that are owned and operated by some of the older producing companies which also still have plants within the city as well as some new plants operated and owned by newcomers in the Montreal crushed-stone field. In this district there are also several proposed plants, which may develop during 1931.

In the older plants, some of which started off with productions as low as 200 tons per day, a small gyratory crusher was the first unit. Later a slightly larger gyratory would be added to act as the primary crusher and using the first smaller unit as a secondary crusher. Now the trend appears to be universally toward the use of jaw crushers for the primary unit, and those plants that did not already have jaw crushers as primary units expressed favorable comments as to their desirability and intimated that if they did install larger primary crushers they would be of the jaw type. Cone crushers are just beginning to be appreciated for secondary crushing and one of the more modern operations uses both a

The Morrison quarry of Martineau and Fils in the heart of Montreal

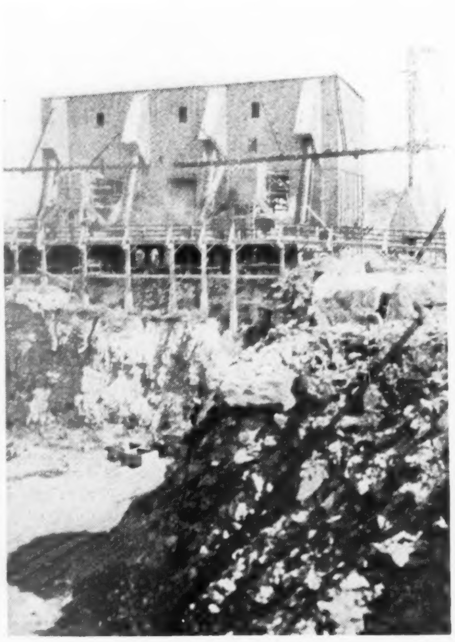
Symons cone crusher and a Traylor finishing crusher for secondary work. The latter crusher, for this particular operation, has proven very satisfactory and was chosen on account of its ability to take a 10-in. stone and reduce it to 1-in. or 1½-in. in one operation. One plant uses disc crushers for secondary reduction.

All Plants Electrified—Diesel Power Being Considered

All of the plants use electric power throughout, but owing to the extremely high power rate that the operators are subjected to and to the fact that the power contracts call for a rate based on a 15-minute peak for the life of the contract, other means of driving their equipment is being studied carefully. Most of the operators in the States pay for a 15-minute peak but only for the month, so one can see what these operators have to contend with.

One company which recently purchased a new 2-yd., Link-Belt Diesel-powered shovel and found that it cut the shovel power costs from about $30 per day when burning coal (at Montreal prices) to a cost of about $3 per day for the Diesel drive, is now seriously considering powering its crushing plant with this type of drive directly connected to an a.-c. generator. Unquestionably, if one company makes this step others will follow suit as several quarrymen there have had similar experiences, and are alive to this possibility of cost reduction.

With some of the quarries having to move out of the city limits, and some contemplating new and more efficient operating plants to offset stiffer competition, with the possibility of merging and the merged companies building larger and better plants; with the possibility of many changing from hand loading to power loading and power transportation; with the possibility of substituting Diesel power for the more expensive electric power: with the possibilities of smaller companies altering their plants as they now stand, and with the possibility of the wider use of trucks in the quarries,



Four bucket elevators which serve four crushers in one of the Montreal plants

Montreal producers as a group are sitting on the rim of an expansion program that should be of extreme interest, not only to the manufacturers of equipment, but to producers in the United States as well, for our home producers may gain some ideas as to how to solve their own pressing problems from the Montreal producers' experiences.

Quarry Operation

All of the quarries in the vicinity of Montreal are pit quarries, ranging in depths of from 12 ft. to approximately 150 ft., some using carts drawn by a single horse for delivery of the stone to the crusher, the drivers guiding their horses up inclined roads that are so long that a "switch-back" is necessary to reach the upper levels. The cart wheels ride on heavy angle irons as trackage. Others use the conventional car incline and hoist; one operator uses skips of novel design, others stiff-leg derricks that are similar to those used in dimension stone quarries, and one operator uses a stiff-leg derrick of quite different design. The more up-to-date operators have moved their primary crushers into the pit, or near the bottom of the pit, and transport the rock by trucks to the primary unit. These plants will all be discussed more in detail later in this article.

Stripping is not a serious factor, as a good grade of rock is encountered at practically the grass roots, and so far expansion of quarries has been in the nature of greater depth rather than lateral expansion. In some of the quarries the first few feet of rock and overburden is removed for fill and other purposes thus insuring no foreign material getting into the stone for the crushing plant. What stripping is done is mostly hand work.

Water and drainage is not a serious menace, for none of the pits encounters enough water to be of serious consequence. Usually a few hours' operation per day of a 3-in. centrifugal pump is sufficient to remove the infiltration for the day.

The stone is a limestone in fairly thin stratifications, in horizontal or nearly horizontal beds. The stone ranges from a high calcium stone to natural cement rock, such as is found at the operation of the Canada Cement Co.'s plant No. 1 near Montreal. As a rule the stone shatters well and is slabby by nature. At one pit, the Maisonneuve quarry of the Villeray Quarry Co., Ltd., the deposit was overlaid with a flow of trap rock and this material was the original stone quarried, but at present no trap rock in any quantity is left, having all been worked out, and the production is now confined to the lower limestone ledges.

Through most of the quarries runs a stratum of reddish, so-called trap rock, or "Benc Rouge" (red seam or strata) as it is referred to by the French. In some of the quarries this stratum is very hard and difficult to crush and is objectionable for that reason. From a superficial examination of the stone it appears to be of excellent qual-

The plant and quarry of Varin Barbin in the St. Michel district of Montreal, with a capacity of 1500 tons a day and where trucks

ity for concrete aggregate, yet the appearance of a few handfuls of the reddish stone in a ton or so of the blue-gray limestone causes some concern to the producer.

By far the greatest part of the tonnage of stone produced within the city of Montreal and in the St. Michel district is delivered by trucks, for none of the plants is served by steam rails. One of the operations of the Villeray Quarry Co., Ltd., and of Martineau and Fils, is served by the rails of the Montreal Tramways, and some stone is shipped by this means. Street car and street traffic congestion of the past few years has materially reduced the amount of stone to be shipped by this method.

In the outlying districts, and by that is meant those plants which do not ship into Montreal proper, the plants are served by the rails of either the Canadian National or the Canadian Pacific railroad. Some of these plants are also equipped to ship by water in barges to points on the St. Lawrence river although as yet none of the stone shipped in this manner enters the city market.

None of the plants washes its product, and none of the operators evidenced any interest in the advantages from such a product, mainly because the stone is free from any other soil, and because a large tonnage of the stone goes for black-top road construction where wet stone would not be received with favor. During wet weather there is some trouble experienced with removal of stone dust, but this problem is not serious.

Some of the crushed stone operators confine their sales and production to a 7-months season, for they feel that the trouble and expense of conditioning wet and frozen stone from the pits or even from the stock piles is too great a handicap to make it worth while. Others attempt to operate, or at least distribute from ground storage piles, during the severe winters.

Rotary screens are used practically throughout the industry, with Niagara vibrators and Stephens-Adamson vibrators used in one of the operations. Undoubtedly in any new plants vibrating screens will receive more attention.

Two views of the National Quarries, Ltd., plant, one of the new operations in the Montreal district

Crushed stone is sold by the ton throughout the district, all plants are provided with truck scales, and those shipping by electric railway are provided with track scales.

Most of the quarries use well drills for primary drilling, with the "Jackhamer" of the Canadian Ingersoll-Rand Co. used practically universally for secondary drilling.

Market Products

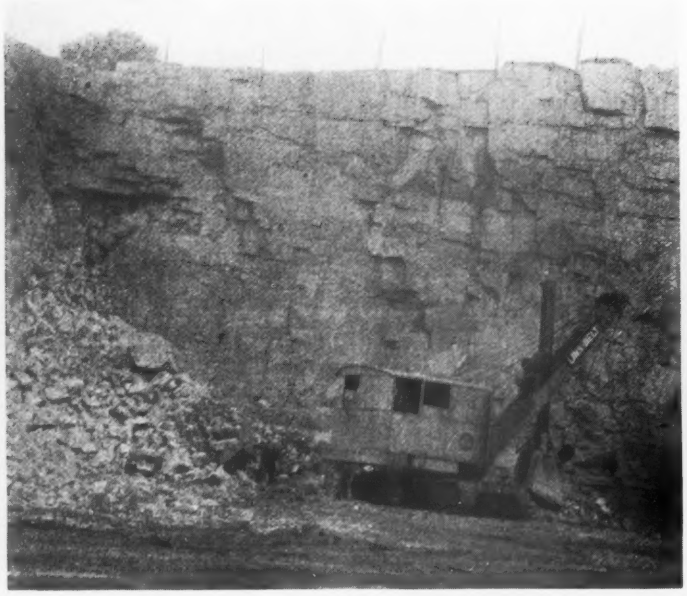
The quarries produce two sizes of stone as their major items, a ¾-in. size and a 1½-in. size with by far the greater part of the crushed stone being sold in the smaller size, although the plants are all equipped to supply any size of stone that the market requires. As most of the stone is sold in the smaller sizes, crushing to those sizes has resulted in the production of considerable fines, and the industry is confronted with this problem in a manner more serious than plants in most of the States. Some of this dust material finds a use as fine aggregate to take the place of sand, which has to be shipped into the city from a distance. Some of the fines are used for asphalt filler and similar uses.

The Villeray Quarries Co., Ltd., has gone into the subject quite thoroughly and, after several trips to Europe by the company's president, Joe Rheaume, as well as the general superintendent, J. Hetu, they have purchased in Germany the district rights to a new type of asphalt paving, and the company is now building a new, all-steel plant to prepare this road-building material from the fines.

This is said to be the first installation to make the new type of asphaltic material on the American continent, and as the material is new, even to the officers of the Villeray Quarry Co., they are not in a position to go into details as to its merits except to say that the material has been in use in Germany for several years with good results, and when made in connection with crushed-stone operations has helped to solve the vexing problem of the disposal of fines. All of the equipment, consisting of pulverizing units, mixers, fans, etc., were purchased abroad. The company has not even given a name to this new product but later we hope to hear more of the results of this interesting operation.

One other company, Duquette and Biron, which operates a small crushed-stone plant in the St. Michel district, disposes of its fines to the Stinson Reeb Builders Supply Co., Ltd., of Montreal, which has a pulverizing plant immediately alongside of the crushed-stone plant. The pulverizing unit is

d where trucks convey the raw material from the shovel to the primary crusher. Stone for lime burning also is shipped from this plant



Some Delorimier and Rogers company methods where material has its ups and downs. Shovel loads to trucks, which in turn take rock up to quarry rim and dump it into crusher near the floor

at present operating on a 23-hr. day basis, using a small rotary drier for preparing the stone dust for subsequent pulverizing in a Bradley pulverizer. About 60 tons per day of high calcium (95% calcium carbonate) stone is prepared daily for the asphalt filler trade. The product is sacked in jute or paper sacks and delivered by truck entirely, as no rails serve the plant.

This same quarry also produces rubble stone and limestone for the production of burned lime. The man-size stone for lime burning is shipped entirely by truck to lime kilns located within the city limits several miles away, where the stone is burned in shaft kilns. Incidentally there are two lime producing companies in the city limits which get their stone in a similar manner. The lime-burning plants are old and of small capacity with only lump lime being produced.

The owners of the two quarries located so close to the heart of the city that eventually public opposition may force them to abandon their plants and pits, have hesitated to modernize their operations although one of the companies, the Montreal Quarry, Ltd., has installed this summer a 24-in. by 36-in. Canadian Ingersoll-Rand, jaw crusher, as a primary unit. This crusher was installed about halfway down the incline to the pit and is served by Mack trucks having standard bodies. Strange as it may seem, right in the heart of the city, a well drill is used for drilling. The stone loaded is by a small Thew, steam shovel.

The other quarry in this district is that known as the Morrison Quarry and is operated by Martineau and Fils. This quarry is only a few hundred yards from the pit of the Montreal Quarry, Ltd., and still sticks to hand loading and horse cart transportation. It was said that the company did not own any of the fifty-odd, one-ton, single-horse carts, that were in use but the carts and horses were owned by the drivers who in most cases are farmers from the province who load and haul the stone on a per-ton basis. This arrangement permits a low loading and transportation cost, and for the tonnage produced probably gives as low a cost as other loading methods. In view of the fact that the company might have to move out at a moment's notice this non-altering policy can only be interpreted as good conservative business.

Brief Descriptions of Typical Operations

To go into details as to the operating methods of each of the quarry operators in the district is not the intention of the writer. I wish merely to give the reader a general idea of the size of the industry, as in a general sense the producer in the Montreal district can learn far more from us as to improvements in practice than we can from them, from an economic or a quality standpoint. Following is a brief resumé of the Montreal quarry and other industries.

Duquette and Biron

This company has been mentioned in connection with the limestone pulverizing plant of the Stinson Reeb Builders Supply Co., Ltd. In the quarry, hand loading is used and the stone is delivered to the plant by carts. Two small gyratories are used for primary and secondary crushing. The plant, including the rubble stone, produces about 600 tons per day. Frank Lapan is president of the company.

Delorimier and Rogers

This company has its offices and plant at 4901 Iberville street and only a short distance from the new asphalt plant of the Villeray Quarry, Ltd., The company uses a 2-yd., Link-Belt Diesel-driven shovel that loads to trucks, which haul the material out of the pit and dump it into the primary crusher located below the quarry rim. A No. 5 Austin and No. 46 Telsmith reduction crusher comprise the crushing equipment. Rotary screens are used throughout, which discharge to wood bins. The plant has a capacity of about 600 tons per day all of which is shipped by trucks. M. Labrecque is president of the company.

De Sales Quarry, Ltd.

This company operates some 20 miles from Montreal, having a plant producing, it was stated, 3000 tons per day, most of which is shipped by rail. The offices are in the Themis Building, Montreal. M. A. Laurendeau is president and Hon. Auttle Lacombe is vice-president.

Laval Quarry, Ltd.

This company has a plant producing 500 tons per day of crushed stone at Cape St. Martin about 18 miles from Montreal. Hand loading is used in the quarry and carts for transportation. Shipments are made over the rails of the Canadian Pacific railroad and by truck. A. Duquette is president; P. Paquin is vice-president and J. A. Lemay is secretary. The offices of the company are joined with those of the St. Bruno Quarry, Ltd., at 6418 St. Hubert street, Montreal.

Quarries of Martineau and Fils

This company has two pit quarries and what might be said to be three crushing plants. The oldest is that known as the Morrison Quarry located at Papineau avenue and Bellechase street, near the center of the city. Carts are used for quarry transportation and trucks for delivery of the crushed material. Gyratory crushers are used throughout and produce about 600 tons per day.

The other and much larger plant or plants are located at Masson and Montee streets. These two units can produce in the neigh-

borhood of 3,000 tons per day with shipments being made by the local street car company and by truck, as the plant is in one of the industrial centers of the city. The stone is loaded by hand at the deeper pit into specially designed flat skip-pan cars. The cars are dropped to a point below any of the four stiff-leg derricks, which elevate the pans to the primary crushers. The stiff-legs are of unique design consisting of a vertical mast and a horizontal mast. A traveling carriage rides the vertical mast.

New plant of the Montreal Quarry, Ltd., built this spring and operated under the name of Union Rock, Ltd.

The whole rig can be swung about on its center axis by a horizontal bull gear that is a part of the base of the vertical mast. The lift motor and the swing motor with controls, operator, etc., are in a small cabin at the base of the vertical mast, and swings with the side movement of the horizontal mast. There are four of these stiff-leg derricks, which were made locally and which serve four Berg jaw crushers and one No. 8 Austin gyratory crusher.

One crushing plant which for convenience, I have called No. *A*, has a gyratory crusher as the primary unit and a disc crusher for secondary work. The two rotary screens are mounted over wooden bins.

Crushing plant *B* consists in reality of four separate units, four jaw crushers, a bucket elevator for each crusher and a rotary screen at the head of each bucket elevator. The jaw crushers are of comparatively small capacity, capable of producing in the neighborhood of 500 tons each per day. The crushers are arranged so that they can be fed by trucks, since some stone is taken from the upper levels by that method.

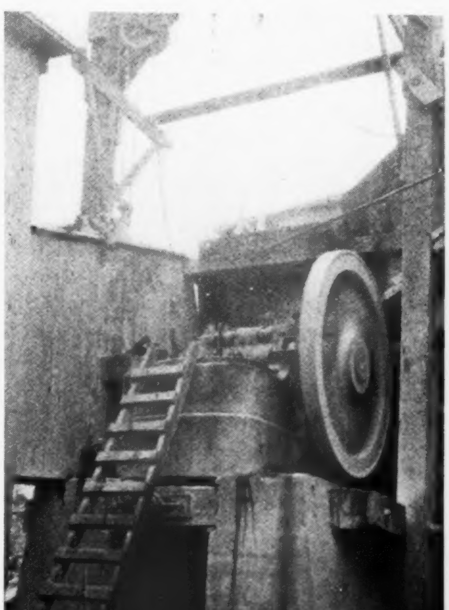
These two plants are almost in the center of the proposed new boulevard previously mentioned. O. Martineau is sole owner and proprietor. R. F. Dykes is selling agent.

R. H. Miner Co., Ltd.

The R. H. Miner Co., Ltd., has two plants, one near that of the Villeray Quarry Co. in the St. Michel district. This operation is quite small, with a production of about 200 tons per day. The Montreal operation uses carts for haulage, hand loading and a small gyratory crusher from which the stone is elevated to a small rotary screen, located over wood bins. The main operation of this company is the St. Laurent Quarry, Ltd., which is some 18 miles from Montreal. This larger plant is located on the Canadian National railroad. R. H. Miner is president and R. Kerr, secretary.

Montreal Quarry, Ltd., and Union Rock, Ltd.

The Montreal Quarry, Ltd., plant is located alongside of the Morrison Quarry in the downtown section and has a capacity of 1,000 tons of stone per day. The company recently put in a new jaw crusher, mention of which was previously made. It also operates a second quarry under the name of the Union Rock, Ltd., at Cote St. Michel Road, this second quarry and plant being built in expectation that the company eventually would have to move out from their downtown site.



Crusher in Montreal Quarry, Ltd., operation

The plant was built during the spring of this year and uses a 20-in. Allis-Chalmers gyratory crusher for a primary unit, which discharges to a 36-in. inclined belt to a scalping screen with the oversize falling to two 6-in. Superior McCully reduction crushers. The products are then elevated by a 24-in. bucket elevator to two rotary screens mounted over wood bins. The plant has a capacity of 1,000 tons per 8 hours. A 1½-yd. Thew shovel, steam operated, mounted on crawler treads, loads to Mack trucks for delivery to the crusher. Air for secondary drilling is supplied by two, 175-cu. ft. per min. Canadian Ingersoll-Rand compressors, each driven by separate 60-hp., Crocker-Wheeler induction motors.

The plant is neatly and well constructed, being one of the trimmest in the district, with an unusually neat brick office at this plant as a part of the companies' holdings. Emile Labelle is president of both companies.

National Quarries, Ltd.

The plant of the National Quarries, Ltd., was acquired by the present owners last year, and they have made minor changes this year. They expect to put in a larger jaw primary crusher during the coming winter and to re-equip the quarry with 7½-ton trucks and also expect to install a cone crusher as a secondary crushing unit. G. P. Cains is quarry superintendent.

All shipments are at present made by truck. The pit is near the new proposed route of the Canadian National railroad, which is making extensive rearrangements of trackage into Montreal at this writing. Incidentally this railroad construction work involves millions of dollars and will require a large yardage of reinforced concrete.

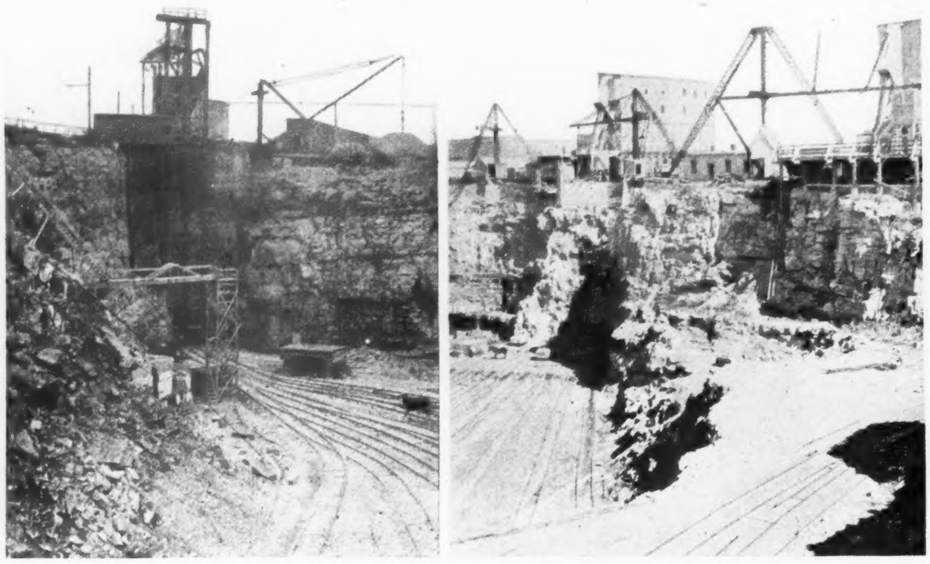
This quarry company is one of the newer ones in this field although the owners of the company are old operators in the Toronto, Ont., district. James Franceschini is president of the company and is also president of the Hagersville Quarries, Ltd., at Toronto.

For primary drilling this operation uses a Loomis electric well drill and a small Bucyrus-Erie gas shovel for loading in the quarry. The company is considering the purchase of a larger shovel. Six Mack trucks with standard bodies are used for quarry

and interplant transportation. A Morse "Speed" crane gas shovel is used for reclaiming from ground storage. This shovel mounted on crawler treads loads to five steel portable bins located about the storage yard.

The crushing equipment consists of a jaw crusher that discharges to a bucket elevator that in turn serves a two-deck Niagara scalper screen. The lower deck of this screen takes out the minus ¼-in. material, which is chuted to a steel bin outside the plant. A small McCully gyratory and a set of rolls are used for secondary crushing. Rotary and vibrating screens are used for the final sizing.

This company is also in the contracting business and owing to several large contracts that the company has this plant was operating two shifts and producing 1,000 tons per day. It considers entering the ready-mixed concrete business although there is one company now operating ready-mixed concrete plants in the city. This latter company is the Ready - Mix - Concrete, Ltd., and has offices in the University Tower building. It uses the Paris type body on its trucks.



Two unusual methods of hoisting raw material in Montreal district. At left is shown skip arrangement used in Villeray St. Michel quarry, where loaded car is elevated vertically to primary crushers where locked car and platform tip. To the right, stiff-leg derricks in Martineau and Fils operation which raise special skip-pans to crushers

Quarries, Limited

The Quarries Limited has offices in the Confederation building, Montreal, and is in essence the old Montreal Crushed Stone Co., Ltd., which several years ago built what was then the largest crushed - stone plant in Canada. This company's plant is located about 18 miles from Montreal at St. Vincent de Paul, and was described in Rock Products soon after the plant was placed in operation. (See the September 13, 1919, issue of Rock Products.) The plant has not been in operation for the past year, but stone is being marketed from stockpiles built up during the previous year.

St. Bruno Quarries, Ltd.

This operation is at St. Bruno, about 20 miles south of Montreal, and is capable of producing about 1,000 tons per day. The stone is shipped by truck and rail and facilities are being installed to ship on the river by barge. The plant was built in 1930. A. Guilbert is president; J. A. Lemay, secretary.

St. Michel Quarry, Ltd., and Northern Quarry, Ltd.

St. Michel Quarry, Ltd., is named after the district in which it is located, the plant being alongside those of both the National Quarries, Ltd., and of Duquette and Biron. The plant of the St. Michel Quarry, Ltd., uses a No. 5 and a No. 2 Allis-Chalmers gyratory crusher for primary and secondary crushing and a 30-ft. by 60-in. rotary screen for sizing.

Hand loading is used in the quarry with the pans elevated to the primary crusher by a stiff-leg derrick. About 500 tons of stone per day is being produced. Alderic Ouimet is president and George Labelle is secretary, treasurer, and also acts as manager of the company.

The officers of this company have organized a subsidiary company and expect to put up a more modern plant that will have a capacity of around 2,000 tons of crushed stone per day. They propose to use a jaw crusher of sufficient size to be economically operated in connection with shovel loading, although at the start hand loading will be used. Cone crushers will probably be used for secondary work. This new company has been incorporated under the name of the Northern Quarry, Ltd., and it expects to build the new plant during 1931.

Varin Barbin

This company's operation is located in the St. Michel district and is capable of producing 150 tons of crushed stone per hour. Last summer the company installed a 36-in. by 42-in. Traylor, "Bulldog," jaw crusher that is fed by a pan feeder. A surge bin feeds a No. 6 Allis-Chalmers gyratory, which acts as a secondary crusher. Two, No. 4 and two, No. 2 Allis-Chalmers gyratory crushers are also used for further reduction. A 1½-yd. McMyler gas shovel mounted on crawler treads loads the quarry stone to Mack trucks having standard bodies, for delivery to the primary crusher. Some stone for lime burning is also shipped from this operation. Joseph Varin is president and T. Barbin is vice-president.

Villeray Quarry Co., Ltd.

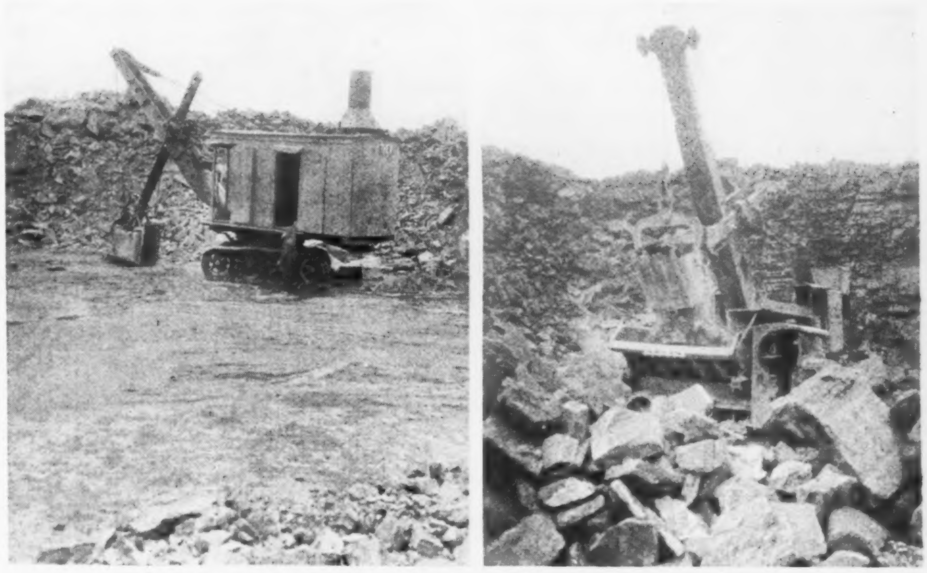
This company is the largest producer in the district, having plants that compare very favorably with similar sized operations in the States. The company has three plants with the largest operation located at Pie IX and Rosemont Blvds., near the industrial section of the city, and two other plants in the St. Michel district. The offices of the company and its new asphalt plant are at 4740 Iberville street, Montreal.

The largest operation is referred to as the Maisonneuve quarry and is operated under the name of the Maisonneuve Quarry Co., Ltd. This company's plant burned completely about three years ago and the present operation was built just across the road from the old plant. It is so located that the new plant rests on the old quarry floor. A 40-in. by 42-in. Buchanan jaw crusher, having manganese-steel, corrugated, jaw and breaker plates, is installed on the quarry floor, fed by a Traylor pan conveyor.

Rock is delivered to the primary crusher by four Mack trucks equipped with 10-ton Easton bodies. The trucks are loaded by a new 2-yd. Link - Belt shovel having an Atlas Diesel engine as the motive power. This shovel has proven very economical as to operating costs and as to service rendered and the company is considering the purchase of another shovel of similar type for other uses. The company also has a 1-yd. Bucyrus-Erie steam shovel. Well drills are used for primary shooting.

For secondary crushing, No. 5 and No. 7½ Austin gyratory crushers are used, augmented by a 48-in. Symons cone crusher. A rotary scalper and three rotary sizing screens are used with the finer sizes being screened on a two-decked, Stephens-Adamson vibrating screen. About a thousand tons of bin storage space is available with additional ground storage that is filled with an overhead conveyor running in a gallery.

The two plants that are located in the St. Michel district are immediately alongside of each other, one plant being quite small, having a production of about 600 tons per day, while its neighbor is rated at 1,200 tons per day. The Maisonneuve quarry has a capacity of 3,000 tons per day. Both of

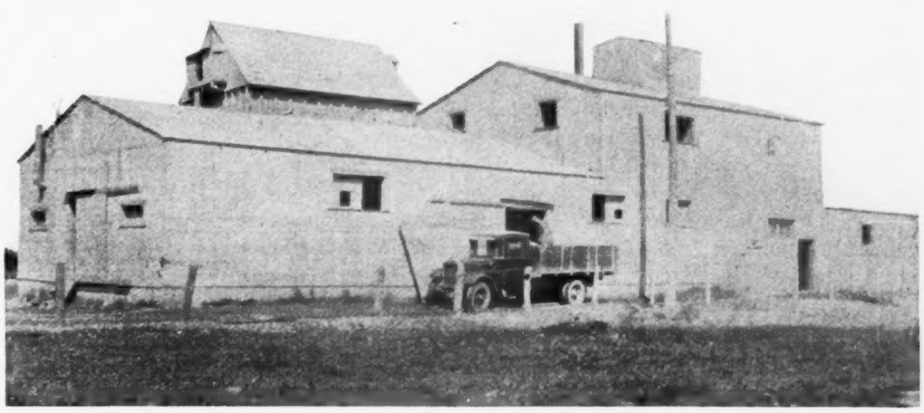


Left, 1 1/2-yd. shovel which loads to trucks at Union Rock, Ltd., quarry, and a scene from the Maisonneuve quarry of the Villeray company, the largest producer in the Montreal district, showing shovel loading to trucks

the two former quarries use hand loading to cars, which are dropped to the foot of special skips.

The skips receive the car on a platform and after the car has been locked into place it is elevated vertically to a point well above the primary crushers, where the car and its platform tip, discharging the load of stone. There are two skips at each of the plants that operate balanced; and as their rate per minute of lifting is slow, only a small amount of horsepower is required. They are entirely automatic in their functioning except the starting which is done by the loader. These skips are patterned after those used in the coal industry around Cleveland, Ohio.

At the larger plant the rock is received by a No. 7 Gates gyratory crusher, with preliminary screening being secured from a 52-ft. rotary screen, which discharges to four separate bucket elevators serving Niagara vibrating screens for further sizing. A No. 410 Traylor finishing crusher is used as a secondary unit. This unit is driven from a 100-hp. Lancashire motor through a Texrope drive. Wood bins are provided for storage as well as ground storage, with reclaiming by a belt conveyor passing through a tunnel under the piles.



Limestone pulverizing plant of the Stinson Reeb Builders Supply Co., Ltd., Montreal. In the background is the crushed stone plant of Duquette and Biron

While these plants are out from the center of the city a distance of about 6 miles, and not near any dwellings, they are, however, close to a large church, and hence have to confine their blasting to small shots. They may even have to move farther out, which would mean building a new plant or depending solely on the other quarry for requirements. R. A. Boutet is general manager.

Within a radius of 20 miles the operations of the St. Laurent Quarry, Ltd., located at Cape St. Martin, are found. At Vile St. Laurent are the quarries of Charles Le Pailleur and at Dickson the plant and quarry of the Dickson Quarries. The Rockland Crushed Stone Co., on Bates road, has apparently suspended business.

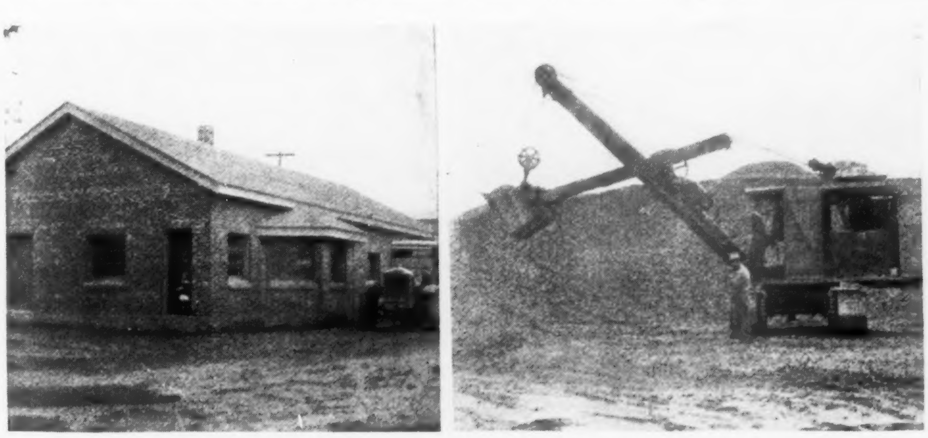
Cement Plant Operations

While they sell no commercial stone, one could add the tonnage that is being crushed in the district by the Montreal plant of the Canada Cement Co., Ltd., and the National Cement Co., Ltd. Recently the National Cement Co., Ltd., merged with the Canada Cement Co., Ltd.

The new crushing plant of the Canada Cement Co., Ltd., alone has a capacity of 800 tons per hour or on a 10-hour day basis, a total of 1,600,000 tons per year. This new plant was placed in operation this summer and is the initial unit of a reconstruction program that when completed will make the No. 1 plant of the Canada Cement Co., Ltd., the largest single cement mill in the world.

The crushing plant is of sufficient capacity to take care of an ultimate production of 20,000 bbl. of cement per day. The unit uses a 54-in. Traylor gyratory crusher that will handle 1,200 tons per hour of this quarry's stone, but at present the secondary crushers will handle only around 800 tons per hour, so primary production is kept to that point. The crusher is driven by a 250-hp. induction motor using a Texrope drive, and has proven very satisfactory for this use.

Not only has the new crushing plant been constructed but at this writing the company is vigorously pushing the installation of four rotary kilns each 364 ft. long and doing con-



At the National Quarries, Ltd., plant. The office, and method of reclaiming material in the yards

struction work of the first magnitude that is necessary to completely change the plant from the dry to the wet process. Most of the equipment going into this new work, with reference to the slurry producing units, grinding mills, etc., are being supplied by F. L. Smidth and Co. Unidan mills will be used to grind the slurry and will be driven through Symmetro drives of that company.

Undoubtedly, one of the basic reasons for changing from the dry to the wet process has been due to the company's experience with similar changes at the Winnipeg and Hull plants. After operating these two altered plants, which first used the dry process and now the wet, a better cement was produced and at favorable operating costs. A cleaner and more nearly dustless operation also resulted.

The Montreal mill is favorably situated for water shipments, and a large part of the tonnage is shipped by water in either of two cargo boats, the *Bulkarier* and the *Cementkarier*. The bulk cement from the plant is loaded to special hopper-bottom, dump cars and hauled to the company's dock where the cement is discharged to a hopper and is elevated to a silo. The boats are loaded from this silo by a 10-in. Fuller-Kinyon pump.

The cargo boats discharge at silos and sacking plants located at Toronto, Ont., Windsor, Ont., Quebec, Que., St. Johns, N. B., and Halifax, N. S. The three latter distribution plants are served by the steamer *Bulkarier*, as that boat is designed to haul bulk cement east to the Maritime Provinces and to the city of Quebec, carry a return cargo of bulk gypsum and coal for the cement company's needs, and also gypsum for the calcining and wallboard plants of the Gypsum, Lime and Alabastine, Canada, Ltd., at Montreal. The crushed, crude gypsum is loaded at the docks of the Atlantic Gypsum Products Co. at Cheticamp, Nova Scotia. This gypsum loading operation was described in full in the April 26, 1930, issue of Rock Products.

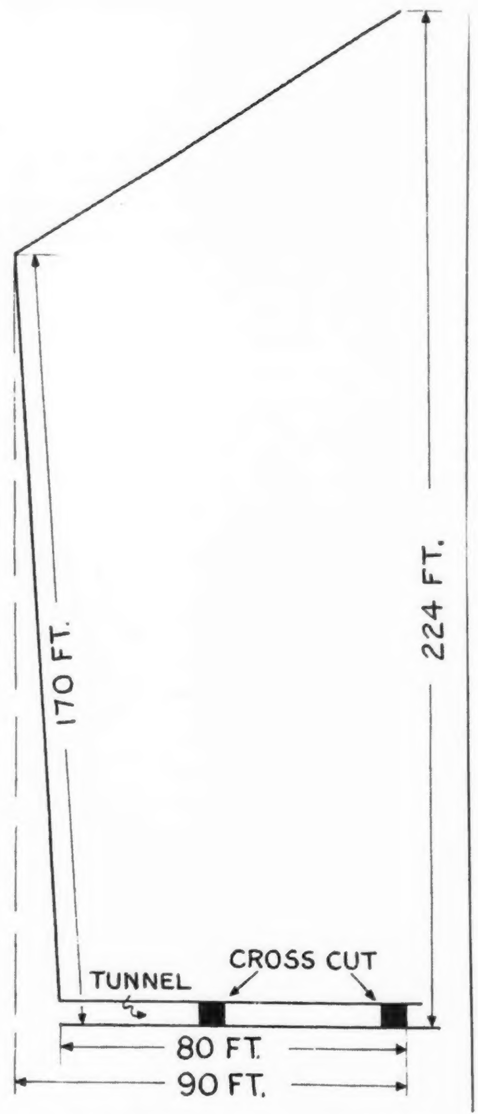
As the cargo boat *Bulkarier* referred to has to handle lump rock as well as cement in bulk it uses drag scraper, elevators and belt conveyors for discharging while the boat *Cementkarier* carries only bulk cement and uses Fuller-Kinyon pumps for discharging.

Blast Blends Deposits

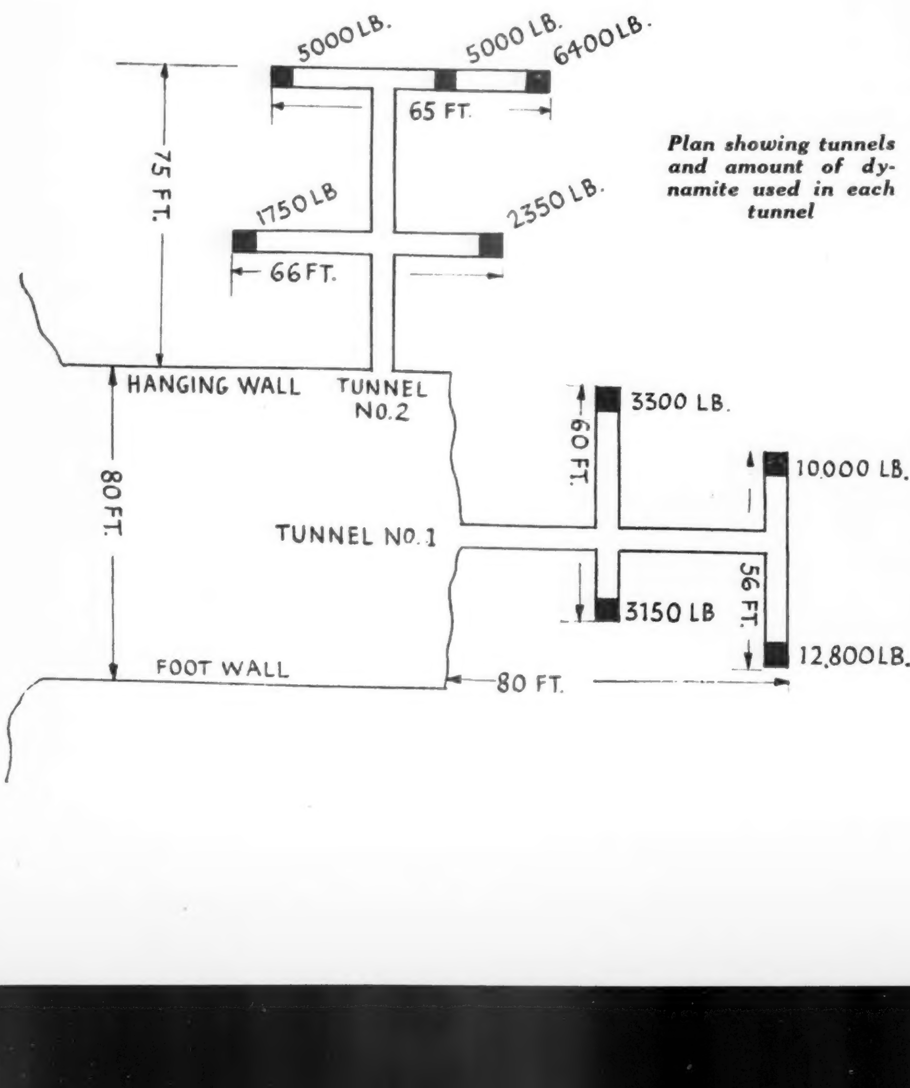
(Abstracted from the *Explosives Engineer*)

A QUARRY BLAST at the Le Grande quarry of the Portland Cement Co. of Utah is interesting both on account of its size and because it was planned and executed so that two adjoining deposits of different compositions were mixed and blended by firing the shots simultaneously. At this quarry, which supplies raw material for the cement plant, the two adjoining quarry faces at right angles to each other, as indicated in the accompanying sketch, contained limestones of different compositions, which it was desired to blend. Therefore the blast was planned with this in view.

Tunnels and cross tunnels were driven into each face near the bottom and loaded with dynamite as shown in the accompanying plan. The face varied from 120 ft. to 170 ft. in height, with a length along each side of about 80 ft. or a total length of approximately 160 ft. The nine powder pockets were loaded as indicated, 49,750 lb. of Hercomite Bog, a bulky granular type of dynamite, being used. Two No. 6 California electric exploders were used in each pocket, which were fired by a Hercules blasting machine. Two and one-half days were required to load and tamp the charges.



The overhanging face made this shot interesting. Diagram of tunnel No. 1



Plan showing tunnels and amount of dynamite used in each tunnel

The project was made more difficult because of the two deposits being tied in and having to be fired simultaneously and was also hazardous because of the close proximity to the crushing plant and conveyor, but was so planned that there was no dangerous throwing of the rock, the bottom kicking out and the top dropping on it.

The blast was witnessed by a number of interested persons and was pronounced a success by the company officials. It was estimated that it broke down about 100,000 cu. yd. of the solid rock, or 225,000 tons, which would provide a three years' supply for the cement plant. These figures indicate a ratio of about 4½ tons of rock per pound of explosive.

Ashby Snow is president and general manager of the company, which has its offices at Salt Lake City. E. J. Gallagher is superintendent.

Researches on the Rotary Kiln in Cement Manufacture†

Part VI—Calculation of Size of the Decarbonating Zone from Thermodynamic Data

By Geoffrey Martin

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Editor's Note

FORMULAS for calculating the amount of heat absorbed by the raw material in the decarbonating zone and for determination of the size of the decarbonating zone are developed, and an original table based on these formulas is computed to show the relation between output, diameter and length of the decarbonating zone of a rotary cement kiln.

THE PRESENT INSTALLMENT deals with the determination of the amount of heat required to manufacture portland cement and where it is used.

Calculation of B.t.u.'s Radiated Away by the Walls of the Decarbonating Zone

In the *decarbonating zone* the calcium carbonate begins to decompose at 805 deg. C. (1481 deg. F.), and the decomposition is completed at 1100 deg. C. (2012 deg. F.).

Hence we may take the average temperature of the material 952.5 deg. C. (1747 deg. F.) and the average temperature of the gas traversing this zone to be 1126 deg. C. (2060 deg. F.).

The temperature of the walls surrounding the raw material will be lower than the temperature of the gas, but higher than the temperature of the raw material. We will, for the basis of this calculation, take the average temperature of the walls in the decarbonating zone to be 1100 deg. C. (2012 deg. F.).

= 2472 deg. F. absolute.

The absolute amount of heat which can be radiated away from the walls heated to this T deg. F. temperature is $H = E\sigma T^4$

when E = emissivity of the brick = 0.72.

σ = black body radiation constant $= 0.162 \times 10^{-8}$ B.t.u.'s/hour/1 sq. ft. 1 deg. F.

Whence $H = 0.72 \times 0.162 \times 10^{-8} \times (2472)^4$ B.t.u./1 hr./sq. ft.

$H = 43{,}358$ B.t.u./1 hr./sq. ft.

And if S be the total surface in square feet of the decarbonating zone, the total amount of heat radiated from the walls is:

$HS = 43{,}358S$ B.t.u. in 1 hour . . (1)

Calculation of Amount of Heat Absorbed by the Raw Material in the Decarbonating Zone per 1 Lb. of Clinker Made

In order to make 1 lb. of clinker we require:

1.1905 lb. calcium carbonate, $CaCO_3$.
0.1846 lb. pure kaolin, $K_2O{\cdot}Al_2O_3{\cdot}6SiO_2$.
0.1540 lb. silica, SiO_2.
0.0312 lb. ferric oxide, Fe_2O_3

Total, 1.5603 lb.

In order to decompose 1.1905 lb. of calcium carbonate at 805 deg. C. requires $1.1905 \times 682 = 811.92$ B.t.u.

There remains 1 lb. weight of raw materials which must be heated from 1481 deg. F. (805 deg. C.) to 2012 deg. F. (1100 deg. C.). The specific heat of the raw material may be taken as 0.28, so that the quantity of heat absorbed in this operation is

$0.28 \times (2012 - 1481) = 148.7$ B.t.u.

Hence the total amount of heat absorbed in the decarbonating zone per 1 lb. of clinker produced is

$148.7 + 811.9 = 960.6$ B.t.u.

or per 1 ton* of clinker made, the number of B.t.u.'s absorbed or rendered latent in the decarbonating zone is

$960.6 \times 2240 = 2.152 \times 10^6$.

Calculation of the Surface Required in the Decarbonating Zone per M Tons of Clinker Made in the Kiln*

Let y lb. of clinker be made by the combustion in the kiln of 1 lb. of standard coal of 12,600 B.t.u. per lb.

Let M tons* per hour of clinker be made $= 2240\ M$ lb. per hour.

In order to make this weight of clinker, the weight of coal required is $2240 \frac{M}{y}$ lb. per hour, and the number of B.t.u.'s evolved from the coal per hour are

$$\frac{2240M}{y} \times 12{,}600 = 28.23 \times 10^6 \frac{M}{y} \text{ B.t.u. per hour.}$$

All this heat pours down through the decarbonating zone. But in making M tons* of clinker there are absorbed or rendered latent in the decarbonating zone

$2.152 \times 10^6 M$ B.t.u. . . . (2)

Hence there occurs an unbalanced residue of heat pouring through the decarbonating zone of

$$28.23 \times 10^6 \frac{M}{y} - 2.152 \times 10^6 M \text{ B.t.u.}$$

$$= M \times 10^6 \left[\frac{28.23}{y} - 2.152\right] \text{B.t.u.}$$

This heat, being free, must be counterbalanced by the same amount of heat radiated from the walls of the decarbonating zone, because the temperature of the walls of the decarbonating zone must steadily increase as the free heat plays upon them until they radiate back as much heat as they receive in a given time.

Hence, equating the heat radiated away by the walls against the free heat from the coal, we get:

$$43358S = M \times 10^6 \left[\frac{28.23}{y} - 2.152\right],$$

or

$$S = \frac{M \times 10^6}{4.3358 \times 10^4} \left[\frac{28.23}{y} - 2.152\right]$$

$$= M \cdot 100 \left[\frac{6.51}{y} - 0.4963\right],$$

or

$$S = M \left[\frac{651}{y} - 49.63\right] \quad . . . . (3)$$

where S = number of square feet required in decarbonating zone to make M tons* of clinker per hour.

M = number of tons* of clinker made per hour by kiln.

y = number of lb. of clinker made per 1 lb. of standard coal burnt in kiln.

(This formula is new.)

Practical Application of Formula

Assume $y = 3$ lb. of clinker per 1 lb. of coal burnt (*i. e.*, a fuel consumption of 33%, which is an ample allowance).

*Tons in every instance are British tons of 2240 lb. To convert to tons of 2000 lb. multiply by 1.12.

TABLE II—GIVING THE CONNECTION BETWEEN OUTPUT, DIAMETER, AND LENGTH OF THE DECARBONATING ZONES OF A CEMENT ROTARY KILN

Output, tons* per hour, M.	Length of decarbonating zone, $L = 17.88\ M$.	Inside diameter of decarbonating zone, brick to brick. Ft.	In.	Inside diameter of iron shell of decarbonating zone, allowing for 6-in. brick lining. Ft.	In.
1.0	17.88	3	0	4	0
1.80	23.95	4	0	5	0
2.81	30.03	5	0	6	0
3.20	32.0	5	4	6	4
3.40	32.9	5	6	6	6
3.80	34.9	5	10	6	10
4.00	35.7	6	0	7	0
4.80	39.1	6	6	7	6
5.30	41.1	6	10	7	10
5.50	41.8	7	0	8	0
6.30	44.9	7	6	8	6
7.20	47.9	8	0	9	0
8.10	50.9	8	6	9	6
9.10	54.0	9	0	10	0
11.20	59.9	10	0	11	0
13.60	66.0	11	0	12	0
16.20	71.9	12	0	13	0
19.00	77.9	13	0	14	0
22.00	83.8	14	0	15	0
25.30	89.9	15	0	16	0
28.70	95.8	16	0	17	0
32.40	102.0	17	0	18	0
36.40	108.0	18	0	19	0
40.50	114.0	19	0	20	0
45.00	120.0	20	0	21	0

Then the surface is:

$$S = M\left[\frac{651}{3} - 49.63\right]$$

$$M = (217 - 49.63)$$

$$S = 167.4\,M \quad . \quad . \quad . \quad . \quad (4)$$

From this formula we can calculate the required surface in square feet in the decarbonating zone for any required clinker output.

TABLE I—SHOWING SURFACE NECESSARY IN DECARBONATING ZONE FOR VARIOUS TONNAGES OF CLINKER PER HOUR

($S = 167.4\,M$)

Tons* of clinker per hour M tons.*	Requisite surface S square feet
1	167.4
2	335.0
3	502.0
4	670.0
5	837.0
6	1005.0
7	1172.0
8	1339.0
9	1507.0
10	1674.0
11	1841.0
12	2009.0
13	2176.0
14	2344.0
15	2512.0
16	2678.0
17	2846.0
18	3013.0
19	3181.0
20	3348.0

Calculation of Length of Decarbonating Zones Corresponding to a Given Diameter and Clinker Output

In the preceding section the correct surface has been calculated for a given clinker output, and a definite law, expressed by the formula

$$S = 167.4\,M,$$

was found to apply.

This law, in conjunction with the law explained in Part III of this series connecting output with diameter, enables us to calculate the length of the heated surface of the decarbonating zone for a kiln of any given diameter.

Let the output be M tons* of clinker per hour.

Let the diameter (reckoned brick surface to brick surface) be d ft.

Then the connection between M and d is given by

$$M = 0.1123d^2, \text{ or } d = 2.98\sqrt{M} \quad . \quad . \quad . \quad (1)$$

Let L feet be the required length of the clinkering zone, and S the necessary surface for an output of M tons* an hour.

Then $$S = \pi d L \quad . \quad . \quad . \quad (2)$$

or $$L = \frac{S}{\pi d} \quad . \quad . \quad . \quad (3)$$

Substituting $$S = 167.4M$$
$$d = 2.98\sqrt{M},$$

we have $$L = \frac{167.4}{\pi \times 2.98\sqrt{M}}\,M$$

$$= \frac{167.4}{9.363}\sqrt{M},$$

or $$L = 17.88\sqrt{M}.$$

Hence the length L of the decarbonating zone for a given clinker output M can be easily calculated by means of this new formula.

Table II gives the results.

(*To be continued.*)

*Tons in each instance are British tons of 2240 lb. To convert to tons of 2000 lb. multiply by 1.12.

Beryl in California

BERYL, the chief source of beryllium, which, with its compounds, closely resembles aluminum, is found in California, but the supply is limited to feldspathic veins of Riverside and San Diego counties.

Dewatering of Cement Slurries by Electricity

IN MOST CEMENT PLANTS using the wet process, the clay-lime-stone mixture is ground in water to a slurry and this thick, soupy liquid is pumped directly to the calcining kiln for dewatering and heating to high temperatures to produce the ordinary cement clinker. The dewatering is done in the cooler parts of the kiln close to the stack end while the clinkering is done at the highly-heated end close to the coal or oil burners. It is thought that a saving can be made in fuel consumption and in the size of kilns if part of the water removal could be performed outside of the kiln in more efficient types of dewatering equipment. Continuous suction filters have been used in some of the newest cement plants for this purpose and the raw material is fed into the kiln in a damp condition instead of the fluid consistency.

Tests are being made at the Northwest Experiment Station of the United States Bureau of Mines, Seattle, Wash., in co-operation with the University of Washington, on the removal of water from cement slurries by electrical methods. The electrical process under investigation uses comparatively simple equipment: a tank to hold the slurry, a fixed cathode plate, and a rotating anode drum on which the slurry collects. The partially dewatered material is scraped off the revolving drum in a layer from a quarter to ⅜ in. thick containing about 22% water. Preliminary tests with a Seattle cement slurry indicate that about 54% water can be removed with a current consumption of from 0.05 to 0.07 kw. h. per lb. of water, which is only about one-fifth of the theoretical energy necessary to evaporate the water by the usual heating methods. It has been found necessary to use a suitable thinning or dispersing agent, and a mixture of sodium silicate and sodium carbonate has given the most efficient results. This electrical process is now in use in Germany in several plants for dewatering clays in the purification of kaolins and fire relays.

The Ceramic Industries of Pennsylvania

BULLETIN 7, by Joseph B. Shaw, head of the Department of Ceramics, and giving interesting information on the ceramic industry of the state, has been published by the School of Mineral Industries, State College, Pennsylvania.

Included in the bulletin is a complete list of ceramic producers and ceramic products within the state, along with chapters on the raw materials and manufacturing methods.

Among the principal products covered are the various ordinary clay products, refractories, whiteware enamels, and glass. Lime and cement are considered as coming within the scope of the term ceramics, so that lime and cement manufacturers are listed.

Sand Plant Developed to Help Sell Crushed Stone

New Plant of the North Shore Material Co. at Burlington, Wis.

By Gordon F. Daggett
Milwaukee, Wis.

IN THE SPRING OF 1929 the North Shore Material Co., Libertyville, Ill., purchased the plant of the Peters Sand and Gravel Co., Burlington, Wis., on the Chicago, Milwaukee, St. Paul and Pacific railroad. This purchase was made primarily to insure a steady supply of sand to sell with the crushed limestone from their Racine (Wis.) quarry. Developments of the 1929 season were such that the company decided to enlarge the capacity of the plant. This decision brought up for discussion future operations, and the need to provide for expansion as demands required. The final decision was to develop the west (or major) portion of the deposit, which necessitated a complete rebuilding of the original plant, relocating the pit operations. The original plant had been built to the east side of the deposit to facilitate railroad siding connections. The plant as purchased included steel stock-piling conveyors on high towers, and the new design was so laid out as not to disturb the efficiency or location of these conveyors.

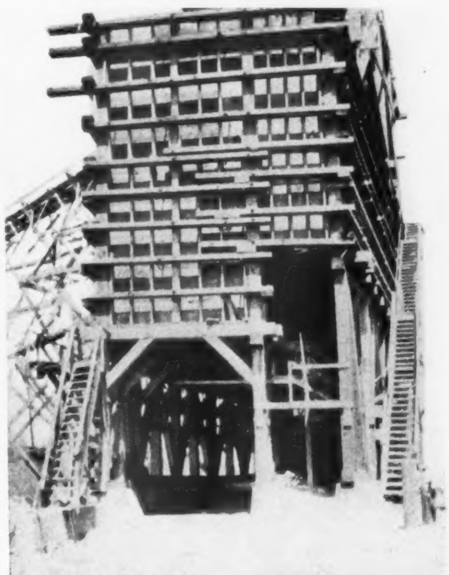


Fig. 1. Showing design and construction to provide additional bin storage

The old bins had a capacity of approximately five cars total and were so located that to enlarge them without disturbing the stock-piling conveyors presented a problem which was solved by building over these conveyors, where they received material from the bins. The original bins were 84 ft. long, 14 ft. wide and 28 ft. high (top of bin from top of loading track rail). The new bins were designed for a 13-car minimum capacity and are the same length (84 ft.), 26 ft. wide and 40 ft. high. The design and construction is shown in the accompanying view.

Flow Sheet

Material in the pit is excavated by a No. 501 Koehring gasoline shovel and discharged into a portable feed hopper (about 3 cu. yd. capacity) having a bar grizzly on top and a Toepfer reciprocating feeder underneath. This feeder is motor-driven with belt re-

Fig. 2. Head pulley of picking belt, also three crushers and return belt

Fig. 3. Another view of the scalping and crushing unit

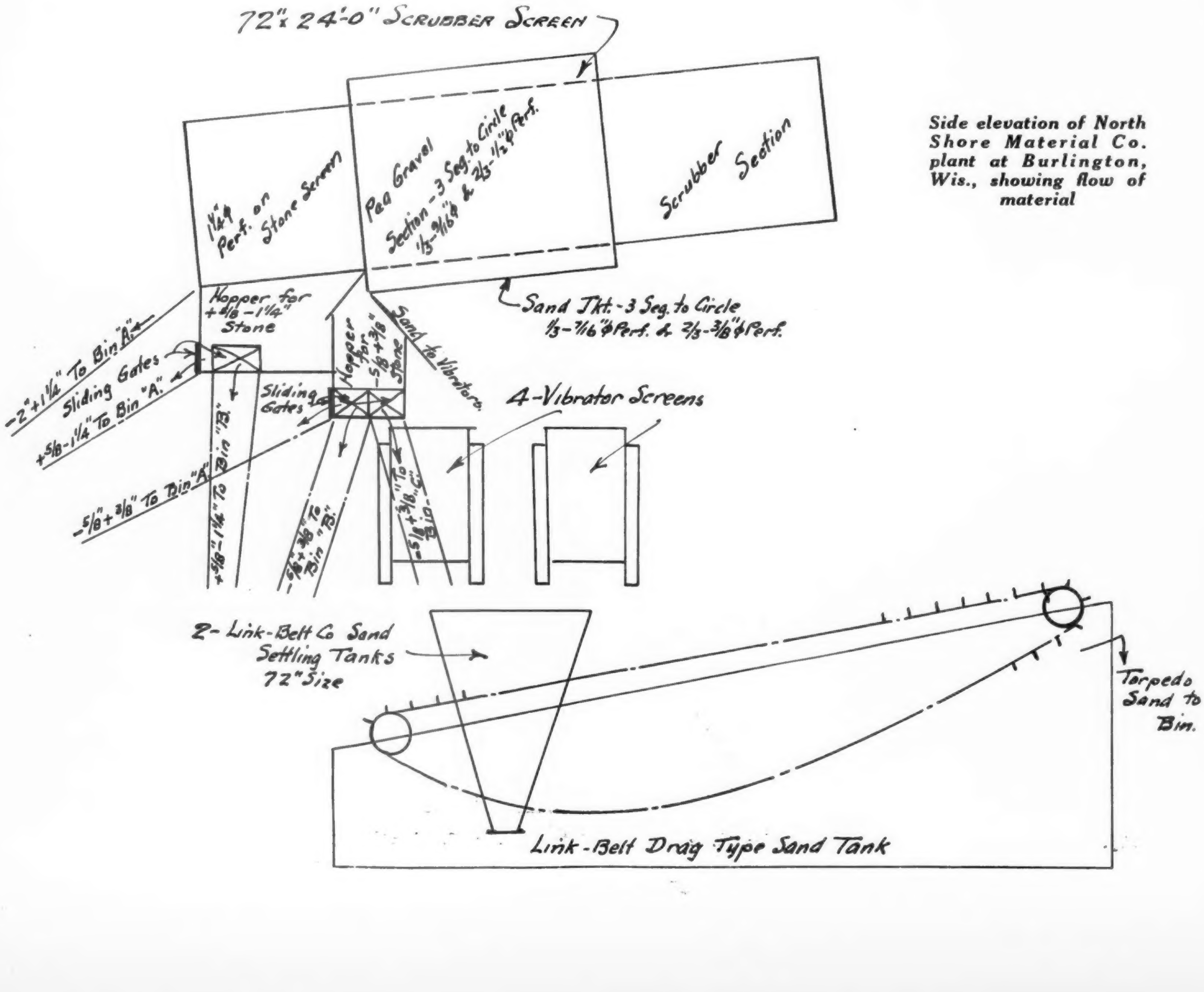
Fig. 4. In this view of the scalper-crushing unit, both scalping screens can be seen

duction, and runs at 50 r.p.m., which gives ample capacity. Material from the feeder passes to a series of 24-in. movable or "fanning" conveyors, running at a belt speed of 250 ft. per min., the length varying up to 200 ft. centers to suit field conditions. Material from the pit or field conveyors is fed into a 48-in. by 12-ft. Allis-Chalmers scalping screen, having 1-in. perforated metal, thereby passing a large portion of the minus 1-in. material directly to the main conveyor and heading for the main plant. Plus 1-in. to minus 8-in. material passes from this No. 1 scalper screen to a 48-in. by 16-ft. center picking belt which is running at a belt speed of 100 ft. per min. to permit removal of lumps of clap and hard pan by hand when necessary. This belt is inclined 3 ft. in its length.

Fig. 2 shows the slatted head pulley of the picking belt in the upper center of the picture. Material from the picking belt passes over a 4-in. bar grizzly, the oversize going to a No. 5 McCully gyratory crusher. Minus 4-in. material passes into a second scalping screen, 48 in. in diameter by 18 ft. long. The first 6 ft. of this screen consists of a blank steel cylinder with 90 deg. lifting plates and 6-in. baffle rings, which cause the material to be retarded in its progress, lifted and pounded or hammered on itself, thereby disintegrating any remaining small lumps of clay or hardpan while in dry condition, to insure their removal by washing

Fig. 5. Looking down return belt toward the crusher

at the main scrubber screen. This second scalping screen has 2-in. round perforations immediately following the blank steel section. Plus 2-in. to minus 4-in. material passes into two crushers, one a No. 5 Gates gyratory and the other a No. 6 Superior



Side elevation of North Shore Material Co. plant at Burlington, Wis., showing flow of material

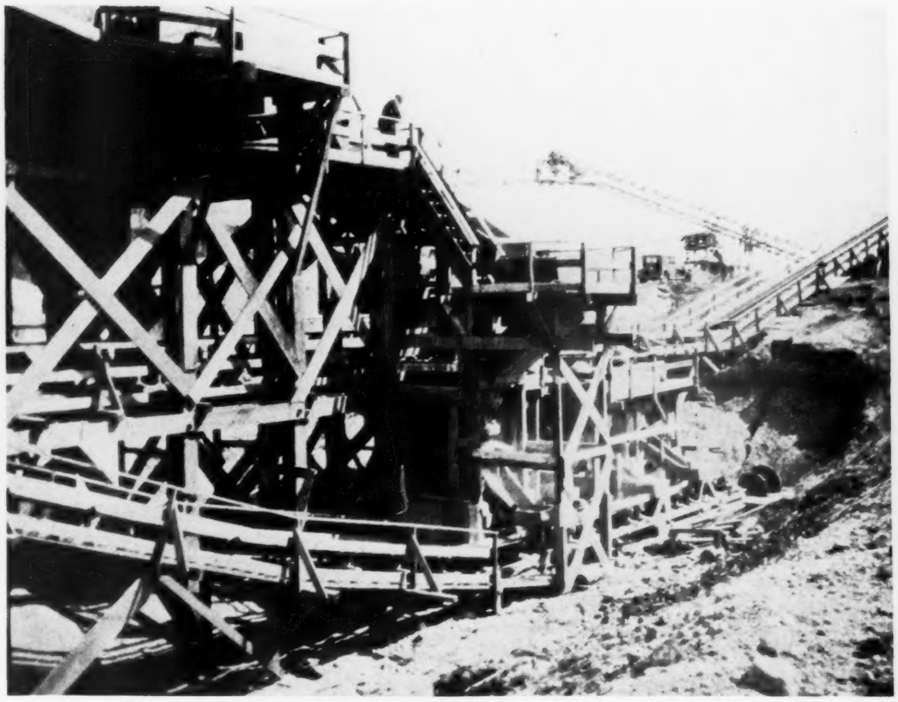


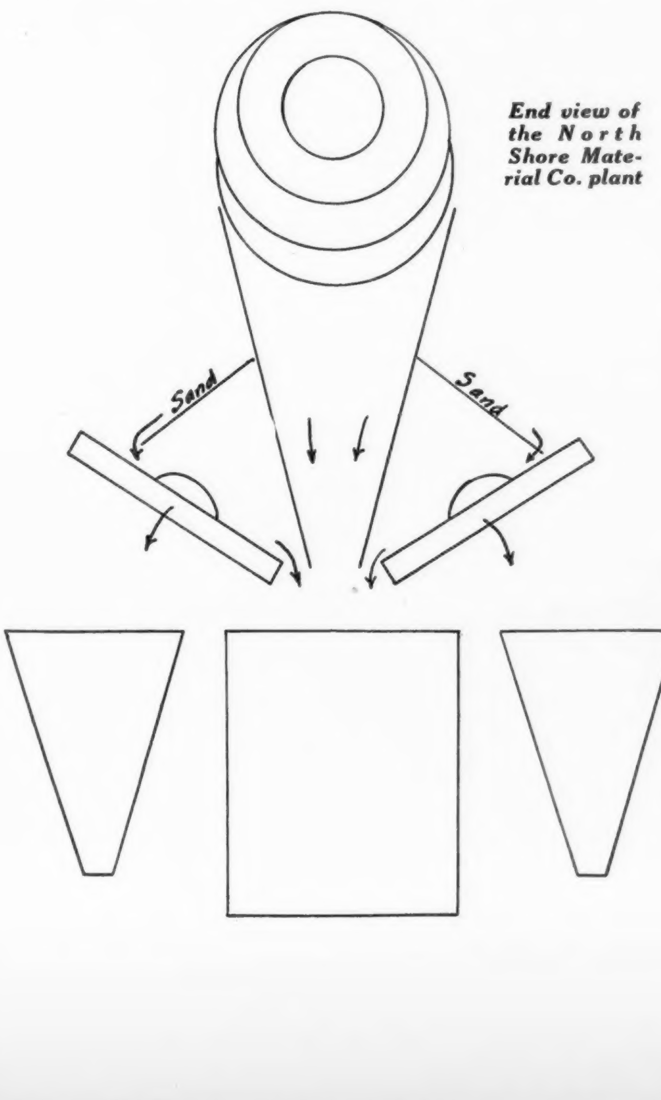
Fig. 6. Crusher-scalper unit, with main conveyor running to the right and stockpile conveyors in background

McCully reduction. (All Allis-Chalmers crushers.)

All three crushers discharge crushed material to a 24-in. by 130-ft. center belt conveyor running at a belt speed of 250 ft. per min., which returns the material to the field conveyor to repeat the scalping cycle and insure proper sizing. Figs. 2 to 6, inclusive, show these features.

Final Sizing

All material of finished size (minus 2-in.) is carried to the main plant on a 24-in. by 408-ft. center belt conveyor running at a belt speed of 400 ft. per min. The maximum incline is approximately 12 deg. and all troughing and return idler equipment is Dodge, Timken roller bearing, which greatly reduces the power requirement.



End view of the North Shore Material Co. plant

At the main plant all material passes into a 72-in. by 24-ft. Allis-Chalmers heavy-duty, closed-end, rotary scrubber screen, having an 8-ft. scrubber with special baffles and lifting plates, and screen sections as follows: Pea gravel section, 9 ft. 6 in. long, with screen in three pieces to the circle, one-third of the circle perforated with $\frac{9}{16}$-in. and two-thirds with $\frac{1}{2}$-in. round openings; stone section, 6 ft. 6 in. long with $1\frac{1}{4}$-in. perforations; and a 96-in. diameter by 9-ft. 6-in. sand jacket, having three sections to the screen circle, one-third with $\frac{7}{16}$-in. perforations and two-thirds with $\frac{3}{8}$-in. perforations. Sand passes from the jacket directly into a large receiving hopper which has four side gates and one end gate. Material from this hopper can be fed as desired to one, two, three or four vibrating screens removing masons' sand and rejecting torpedo sand into a 60-in. by 30-ft. Link-Belt drag type classifier and dewaterer, which discharges to the sand bin for car or stockpile loading.

Fig. 7. Looking down the main belt toward crusher. Extra portable feed hopper at the right

Masons' sand passing through the vibrators flows into two 72-in. Link-Belt automatic sand separator tanks, both discharging into the same bin for car loading. No attempt is made to stockpile masons' sand.

Three sizes of gravel are produced and stored in proper bins, and the discharge from these bins may be either into cars for immediate shipment or to the stockpile conveyor. Arrangements in the form of hoppers with adjustable gates were installed

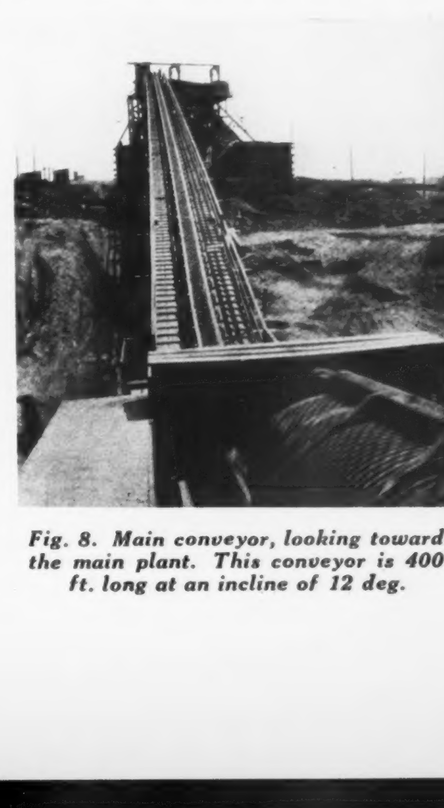


Fig. 8. Main conveyor, looking toward the main plant. This conveyor is 400 ft. long at an incline of 12 deg.

under the main screen to permit a wide range of percentage variation of sizes in order to cater to any market requirements. Incidentally, the Wisconsin State Highway Commission is now trying out various proportions of the different sizes of coarse aggregate, and on a few contracts under construction at present the coarse aggregate is being delivered to the job in separated sizes and mixed by weight at the batchers. This insures a more accurate control of the mixture gradation and gives a high strength concrete at a minimum cost.

Power Details

All power in the plant is electric (a.c., 3-ph., 60-cy., 440-v.), and in so far as possible each unit of equipment has its own power unit. Water is supplied by two Allis-Chalmers centrifugal pumps, direct-connected to motors, one pump being a 6x5-in. and the other a 4x3-in. A total of 1700 gal. of water per minute is delivered from nearby ponds which are spring-fed. Provisions were made to insure the rapid return of the waste water to the main pond, after filtering it through sandy soil for a short distance.

Power transmission from motors to their respective units is made by gears and flat belts in light duty cases, and by multiple Texrope drives in heavy duty cases. A standard gage switching locomotive, owned by the company, spots and switches cars as required.

The capacity of the plant is of course variable, depending on the run of material in the pit, but is estimated at an average of five to six cars per hour of finished material. The company has sufficient acreage to insure a good supply of sand and gravel for several years, thus warranting the heavy plant expenditure caused by the rebuilding operations.

Personnel

The company also owns and operates, besides the Racine quarry above mentioned, a 12-in. hydraulic sand and gravel plant at Libertyville, Ill. Otto A. Cheska, of Racine, is vice-president and general manager; Arthur J. Stock, of Milwaukee, is general sales manager, and Morris Christenson is superintendent of the Burlington plant.

The new plant was designed and the erection supervised by the Boehck Machinery Co., Inc., of Milwaukee, Wis., of which R. E. Boehck is president and Gordon F. Daggett, the writer, was then chief engineer.

What Is "Crushed Boulders"?

WE PRESUME there must be, to engigineers, a distinguishable difference between crushed gravel, crushed boulders and crushed stone, but on the Pacific Coast they are all known as crushed rock—and we can see no good reason why it is not thus accurately defined. The question arises from this notice coming to our attention:

"Sealed proposals will be received at the office of the City Purchasing Agent, Room 143, City Hall, Cincinnati, Ohio, at 12 o'clock noon, Wednesday, October 1, 1930, for furnishing one thousand (1,000) tons No. 4, No. 5 or No. 6 Grade A-1 Crushed Limestone or Crushed Bowlders to the Department of Highways."

Fig. 9. Looking down on the main conveyor from the main plant. Hills in background are future workings

Fig. 10. Main plant and head portion of the main conveyor

Fig. 12. Looking down from the top of the main plant over stockpile conveyors and storage tracks

Fig. 11. Main p'ant. To the right in the distance are the stockpile conveyors

The Manufacture of Gypsum Plasters

Part IV—Gypsite and Its Products

By A. M. Turner, E.M.
Denver, Colo.

ALTHOUGH GYPSITE PLASTERS (commonly called "dirt plaster," or "dark plaster") have been manufactured for many years, there is very little information published relative to the subject. Since the origin of gypsite deposits are widely disputed, and because the manufacture of products from this material presents many peculiarities when compared with gypsum, the subject as a whole is most interesting.

Gypsite occurs abundantly in the states of Oklahoma, New Mexico, Texas, Arizona, California, Nevada and Wyoming, and has been in the past or is at present being worked in these states. The greatest influencing factor controlling the cost of manufacture of products from this mineral is its free moisture content. This figure varies from practically nothing to as much as 50%, and it is true that manufacturing plaster from some of the wetest deposits costs more than twice as much as where dry material is used. Expressing the above statement in cost of production of plaster loaded on cars the figures vary from \$2 to \$4 a ton.

In discussing this subject I feel that I can most successfully express facts for the reader by drawing comparisons between gypsite and gypsum and their products, because those interested in plaster products are particularly familiar with the mineral last mentioned.

This article is not being written to attempt to make suggestions for operating cost reductions, quality control methods, or anything similar; but instead I have planned to point out facts of general interest about gypsite and give a brief description of a mineral and its products which in the past has not received its share of attention.

Editor's Note

THE PECULIARITIES of gypsite as a raw material for stucco or plaster are described in greater detail here than, so far as we know, anywhere else in English literature. These peculiarities govern the method of quarrying or recovery of the raw material, its handling, calcining and subsequent treatment. The chief advantage of gypsite plasters is their keeping quality without the deterioration common to gypsum plasters.

Geology of Gypsite

The general theory for the formation of gypsite is that waters percolate through deposits of gypsum rock and take some of the mineral into solution. Then perhaps, this water travels for miles underground, possibly dissolving other minerals, but eventually it comes to the surface in the form of springs, swamps or lakes. The gypsum and impurities contained in this water are finally precipitated through evaporation, aided by the action of organic matter of decaying vegetation, and form the deposit known as gypsite.

A deposit formed in this way frequently has a composition approximately as follows:

Gypsum ($CaSO_4 \cdot 2H_2O$) 75%
Lime carbonate ($CaCO_3$) 8%
Silica (SiO_2) 15%
Iron and aluminum oxide (Al_2O_3 and Fe_2O_3) .... ½%
Miscellaneous 1½%

The most important characteristic of gypsite is not its impurity but rather the lack of crystallization, and its native semiplastic condition, due to some obscure condition of its origin. It is this fact, in all probability, which is responsible for gypsite plasters having superb working qualities, and keeping indefinitely without deteriorating.

A simple illustration of the formation of gypsite may be described as follows. A valley may be pictured which has a large gypsum deposit at its upper end. For a period of long duration water may have leaked through and around this gypsum and then followed an underground course down the valley. Assuming the proper conditions, this water may have come to the surface at a place where a natural lake bed, which had a restricted outlet occurred. Eventually the water which was fed into the depression evaporated, leaving a deposit of the minerals which were held in solution, thus forming a stratum called gypsite.

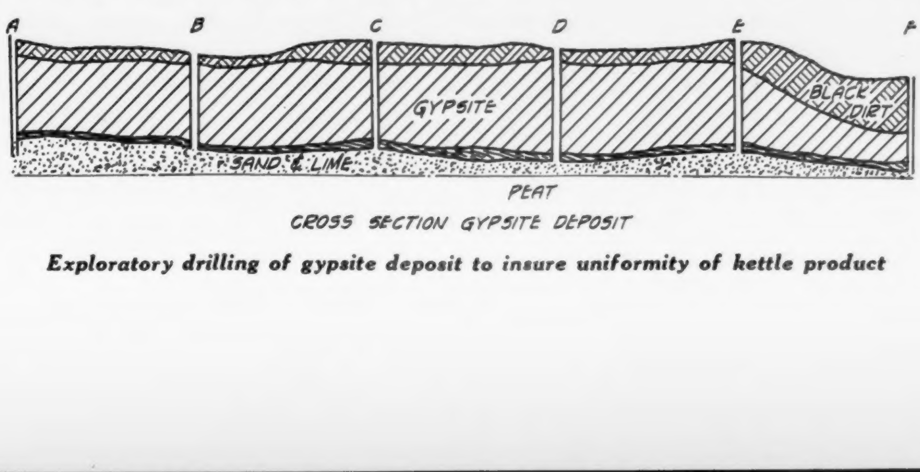
A typical section found in some deposits presumably formed as above mentioned, would be as follows: First, a layer of earth and organic matter originating from plant life, averaging about one foot in thickness; then, from two to twenty feet of gypsite of the composition similar to that previously mentioned. Next, a layer about six inches thick of black organic material resembling peat to some extent, which contains small shells and well preserved bones of animals, presumably jack rabbits, antelope, or buffalo; and below this a thick deposit of sand high in lime content. However, I have seen deposits entirely free from the peat formation mentioned, and the material underlying the gypsite was quartz sand and shale.

The color of the mineral being discussed varies from white through all the intermediate shades to a strong pink or blue. Although at times the color is a dependable, rough index to the purity of the deposit, at other times it is most misleading and cannot be relied upon.

Proof of the claim that some at least of these deposits are of lake, spring, or swamp formation is usually obvious, for the contours of a gypsite bed are regular and follow fixed lines corresponding to those which water levels would assume.

Another theory for the deposition of earthy gypsum is as a mechanical process, as follows: The weathering away of massive gypsum or the other forms by the action of running water would produce what might be called gypsum sand. These small particles, by constant friction, would produce minute crystals which could be carried for long distances in suspension by running water, and finally graduated according to size in the stream's bed. During the course of action of the water, clay and other impurities characteristic of gypsite could be picked up and intimately mixed with the mineral. If this theory has a substantial foundation one would expect to find deposits of a shape characteristic of a stream bed, and there are deposits one could easily imagine, from observation, had been made in this way.

Two other possible theories for gypsite formation are as follows: First, gypsite may be formed by a complete process of disintegration of gyp-



Exploratory drilling of gypsite deposit to insure uniformity of kettle product

Fig. 6. Method of prospecting gypsite deposit for control of operations

ANALYSIS TABLE

	Thickness, black dirt	Thickness, gypsite	—Gypsum content in gypsite— Top	Middle	Bottom
Hole A	1½ ft.	8 ft.	68%	75%	76%
Hole B	0 ft.	9 ft.	75	81	87
Hole C	2½ ft.	8½ ft.	61	80	79
Hole D	1½ ft.	10 ft.	74	82	84
Hole E	2 ft.	9 ft.	58	75	70
Hole F	6 ft.	3½ ft.	40	70	65

sum rock, as a result of weathering action by surface and underground water. Second, it may be formed by the alteration of lime and magnesium carbonate by the action of water or vapors charged with sulphuric or sulphurous acids.

Gypsite is classified as true and false. The true mineral is that formed as a secondary deposit from gypsum, as previously described, by underground water rising into a lake bed and there being evaporated. False gypsite is simply disintegrated gypsum which occurs at the base of cliffs and has not undergone the change by solution.

In New Mexico, west of Tularosa, is a most interesting formation of wind blown gypsum, which has formed extensive dunes of graduated particles of the mineral. These sands originated from disintegrated gypsum deposits located miles away. The dunes are reported to extend 28 miles in length, 8 to 15 miles wide, and have an average height of 20 ft. I have personally made chemical analysis of samples of the mineral from this deposit and found it to be a good grade, high purity gypsum. These deposits at present are too far from a railroad and large market to make them of particular value.

Quarrying or Mining Methods

Gypsite is quarried or mined usually by one of three methods:

1. Loading the material into horse-drawn scrapers, hauling it over a bridge below which are cars or wagons where the mineral is dumped.

2. The use of tractors instead of horses to pull the scrapers.

3. Reclaiming by use of a power shovel.

When working a deposit of earth gypsum it is almost always necessary to strip off a certain amount of overburden from the deposit. This can be done by means of a power shovel or dragline, when one is available. However, a common method which is still used to a considerable extent is to plow the surface of the formation and then remove the overburden, which is usually sand or loam and roots of vegetation, by use of a fresno. The material removed in this way varies in thickness from nothing to as much as 4 ft. The next step in the process is to loosen the gypsite by plowing, if scrapers are to be employed for loading, but of course the plow is not necessary if a shovel is to be used, as the gypsum earth is generally very soft and can be easily scooped into the bucket and dumped into cars.

Although the general principle of the operation above described is very simple, there are numerous complications to be faced which make it a more difficult problem than it seems at first. Stucco made from the gypsite taken from the top of the deposit usually has a very much different setting time than that made from the mineral taken from the bottom; and also there is a radical difference in setting time of gypsite taken from different sections of the bed. Likewise, the purity is vastly different throughout various sections of the workings. This fact makes it necessary to load the material so it will be scientifically mixed at all times. Otherwise the result will be a lack of uniformity in quality.

In a previous article I stated that at Laramie, Wyo., the plaster made from gypsite taken at the top of the deposit sets much faster than that made from the bottom material. The explanation for this is the presence of soluble salts precipitated at the surface which act as accelerators, while the setting of plaster made from the bottom mineral is retarded by organic matter which looks like peat. Then, strange as it may seem, at Sweetwater, Tex., the plaster or stucco made from the top of the gypsite deposit is very slow setting while that at the bottom is fast setting. In that locality a heavy growth of vegetation has developed sufficient organic matter to be extremely retarding in the surface material, but at the bottom of the deposit is a considerable quantity of silica which serves as an accelerator.

Control of Operations a Prime Essential

To satisfactorily control the gypsite mixture for purity and setting time, a successful plan has been worked out for sinking holes at regular intervals across a part of the deposit to be worked, and then drawing cross sections to show the depth of the strata, and the analysis of the mineral at its various depths. It may at times be found necessary to mark out a deposit in 20-ft. squares and sink a test hole every 20 ft. The accompanying sketch shows a drawing of a typical cross section of a gypsite deposit where the holes were spaced 20 ft. apart. As shown by the accompanying table the thickness of overburden and that of the gypsite are recorded, also the average gypsum content of the top center and bottom portion of the gypsite strata. With this information at hand the quarry foreman is in a position to plan his work so he can furnish at all times a comparatively uniform mixture of material for the calcining mill. The quarry is a very important unit from a standpoint of quality control in the manufacture of gypsum products.

As it is plain to be seen from previous statements, the variation of conditions relative to gypsite deposits is most extreme, so it is difficult to establish any fixed rules which will apply to all gypsite deposits and different localities; and this statement is further verified by the fact that the free moisture in different deposits varies from practically nothing to more than 50%. When the mineral under discussion carries more than 25% free moisture it is of the same consistency as mud and becomes almost impossible to work.

Moisture Content Determines Method of Operation

Some of the gypsite in Wyoming has a very high moisture content, and on account of this fact the gypsum earth freezes solid for a period of six months during the year and the only way it can be worked is by shooting it loose with dynamite. By building a pile of gypsite in the summer time during the driest season, then plowing and disking the material during the summer and at intervals during the winter the gypsite can sometimes be kept from freezing completely, so that it can be worked satisfactorily during the cold period of the year. In all events, handling gypsite which is wet is a costly operation and far from being dependable. On the other hand, in Texas the gypsum earth becomes so dry at times that it flows almost like hot stucco and is especially hard to handle in scrapers because it runs off the pans so easily. If horses are used the dust blows into the eyes and nostrils of both animals and men, thus creating at times a most disagreeable situation to endure.

An interesting formation I observed for several months' time in a wet gypsite deposit in Wyoming was a spring of water which developed in a gypsite deposit after the mineral had been removed to within about three feet of the bottom of the formation. When the water first began to appear nothing was thought of the phenomenon as springs were more or less common there. However, as time went on, the gypsite surrounding the spring was removed until the surrounding surface was at least 2 ft. lower than where the water oozed out, but the water continued to flow in a small stream from a knoll. Furthermore, not over 25 ft. away was a canal, the bottom of which was 5 ft. lower than the spring. Naturally one would expect the water to come to the surface somewhere on the lower ground or to seep through the earth into the canal. The only way I account for the condition just described is that at one time an animal had dug a hole into the gypsite and burrowed its way through the deposit. Later the hole filled with earth which was less impervious to water than gypsite. This could account for the fact that the water followed this course to the higher ground rather than find its way through the gypsite to the surface at a lower elevation.

Calcining Gypsite

Although no definite crushing or grinding method is employed in milling gypsite, it is sometimes found advantageous to use some form of disintegrator, because at times earthy gypsum occurs in sufficiently hard lumps to cause difficulty in conveying and elevating the material. Frozen gypsite is almost as hard as gypsum rock and causes considerable difficulty in handling through machinery, so a disintegrator is a real benefit in taking care of such an annoyance.

Earthy gypsum cannot be stored in bins and hoppered successfully into spouts or conveyors as is done with ground gypsum rock. The reason for this is that the free moisture causes it to stick together in a pasty mass. Therefore, methods used are to store the material in a shed where it is either hoed by hand into the conveying system or else carried by means of a clamshell to the hopper which feeds the elevators supplying the kettles. When the gypsite is very wet it cannot be handled by screw conveyors at all, and even drag conveyors will not adequately handle the mud. Gypsite can be put through a dryer to remove free water which makes it much easier to handle in the remainder of the equipment. On account of the clay-like composition of the material being discussed, a rotary dryer will only function about 50% efficiently.

Advantages in Stucco Manufacturing

A full description of gypsite calcination was given in article No. 2 of this series and from the description there it may be seen that gypsite has to be charged into the kettle in intermittent batches to avoid sticking the kettle, and also the time for calcination is much longer than with gypsum. These conditions are no doubt caused largely by the fact that so much free moisture is present, and on account of the nature and amount of impurities present.

The greatest economic advantage the manufacture of gypsite stucco has over gypsum stucco is that grinding costs are eliminated. However, this saving is often more than overbalanced by the fact that more time and fuel are required to drive off the large quantity of free moisture which is contained in gypsum earth. Therefore, the cheaper product is almost wholly determined by the amount of free moisture contained in the raw material.

Gypsite stucco is screened and if the amount of tailings is sufficient to justify the expense, the tailings, or larger particles which do not pass through the screen are reground by a buhr stone and again passed over the screens.

Packing Department

The most important thing to be said about the packing department is that gypsite stucco can be stored for a period of a year or even longer without noticeable deterioration. On account of this fact some small producers follow the practice of calcining several thousand tons of stucco in the late fall to put in storage to take care of shipments during the slack season of the year until business opens up again in the spring. The chief advantage of this practice is that in cold climates where gypsite deposits freeze solid, the quarry may be abandoned during the most severe part of the season, and the accumulated storage of stucco used to take care of shipments.

The weight of a cubic foot of plaster made from gypsum earth is about 60 lb., as compared with around 72 lb. for gypsum plaster. This fact makes it possible to use smaller containers for the dark plaster, thus facilitating a slight cost reduction as compared with rock plaster.

Products which are made from this earthy mineral are quite limited and consist of fibred, unfibred, and wood fibred plaster. A small amount of plaster containing wood and hydrated lime is also manufactured for the purpose of applying to concrete walls.

Plaster board and tile are made in a few instances with gypsite stucco, but it is generally conceded that the gypsum stucco is the most desirable material to use for these products.

Quality of Gypsite Stucco

The dark gypsite stucco, on account of its usual organic content, which serves as a retarder, is slower setting than gypsum stucco, so naturally less artificial retarder is required to obtain the required set for the plasters which are made from gypsite than for plaster made from the rock mineral. I have actually seen large quantities of gypsite plaster, which contained no artificial retarder, shipped to customers, and still the setting time was satisfactory.

The strength of plaster under discussion is less than that made from gypsum. The reason is that the active constituent $CaSO_4 \cdot 2H_2O$ is less in gypsite than it is in gypsum. The dark plaster is reputed to make stronger walls than its light sister, but the reason is that considerably less sand is added to gypsite plaster on the job than to white plaster.

Gypsite plaster varies in color and is always more or less dark, and for this reason the only way it can be satisfactorily used for a finish is for sand floated walls.

Conclusions

The most outstanding justifications for the manufacture of gypsite plaster are: First, it will keep in storage indefinitely without deteriorating, which is not true of gypsum plaster; for the small town lumber dealer who uses but one or two cars a year, or possibly less, the dark plaster is certainly the most satisfactory material; second, when gypsite deposits are comparatively free from an appreciable amount of free moisture the manufacturing process is considerably cheaper than where gypsum is used, and as the finished products sell for the same price the margin of profit is greater where the dark mineral is used.

Wind Pressures on Circular Cylinders and Chimneys

According to a paper by H. L. Dryden and G. C. Hill in the Bureau of Standards *Journal of Research*, September, 1930, the wind pressure on a chimney is a function of ratio of height to diameter.

A summary is given of experiments carried out on the measurement of wind pressure on small models in a wind tunnel, on a 10 ft. by 30 ft. cylinder in natural wind, and at one level of the 10 ft. by 200 ft. power plant chimney at the Bureau. The overturning moment on the 10-ft. by 30-ft. cylinder was also directly measured. The general conclusions drawn from these results were that small model experiments can not be safely used in determining force coefficients on chimneys, but that a wind pressure of 20 lb. per sq. ft. of projected area at a wind speed of 100 miles per hour is a safe value to use in designing chimneys whose exposed height does not exceed ten times the diameter. Another point brought out is that the pressure may reach large values locally, so that this must be considered in designing thin-walled stacks of large diameter. It is considered that further experiments are necessary to obtain satisfactory information on the variation of wind pressure with the ratio of height to diameter. This and other research papers are for sale by the Superintendent of Documents, Washington, D. C.

Detection of Fluorine

A method for detecting small quantities of fluorine in silicates and stones is described by I. P. Alimarin in *Z. anal. Chemistry*. He mixes 0.2-0.5 g. of finely powdered substance in an agate mortar with 1 g. of B_2O_3. The mixture is poured through a funnel into a glass combustion tube sealed at one end and containing a cylinder of Pt foil at the closed end. It is well to blow an enlargement near the open end of the tube and connect the open end with a U-tube filled with water.

Insert the combustion tube through a hole in a shield of asbestos board in such a way that the open end of the tube is kept cool while the closed end, where the Pt foil is in contact with the powdered mixture, is heated by a blast lamp in a furnace like that used by Penfield to expel water from silicates.

After heating 10-15 min. at the full heat, which is reached slowly, seal off the end of the tube. In this way all F is volatilized as BF_3, which is absorbed by the water.

Test the acquired solution with de Boer's reagent prepared as follows: Mix 2 c.c. of 1% $ZrOCl_2$ solution with 5 c.c. of 0.3% sulfoalizarin solution and add 60 c.c. of condensed HCl. The reagent has a beautiful reddish violet color which changes to lemon-yellow when F^- is added. The reason for the reaction is probably the fact that the Zr required for the formation of the violet color is withdrawn by the F^- by the formation of more stable H_2ZrF_6.

Three views of the Laura Gravel and Stone Co. crushed-stone plant at Phillipsburg, O., showing the new agstone silo, loading bins, and at right, incline from the quarry

Small, Efficient Plant Produces All Sizes of Limestone

Laura Gravel and Stone Co., Phillipsburg, Ohio, Has Operation to Be Proud Of

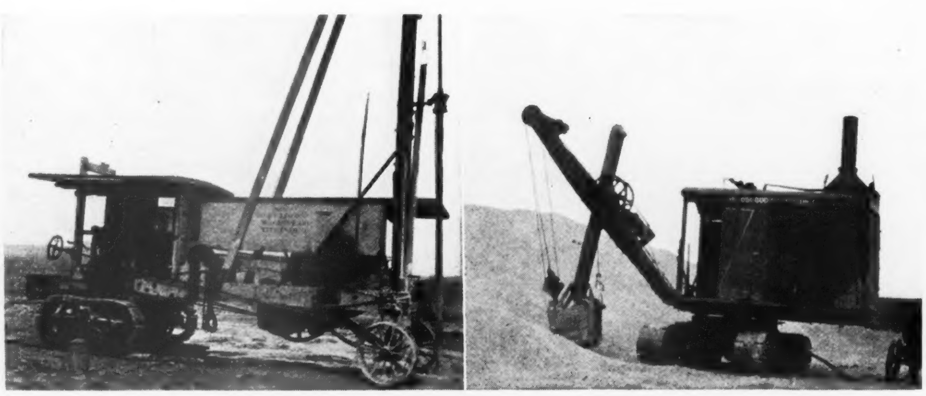
THE PLANT of the Laura Gravel and Stone Co., located about 1½ miles south of Phillipsburg and 13 miles northwest of Dayton, Ohio, on state highway No. 51, is a good example of what may be accomplished by careful planning and the utilization of modern equipment.

Originally formed for a gravel operation, the company has been operating in its present location on a limestone deposit since 1923, growing in that time from a small beginning to a plant with a capacity of about 500 tons of crushed stone per day.

The original crushing and screening plant was of timber construction with the usual simple arrangement for crusher, recrusher, bucket elevator and revolving screen. In 1926, with increased demand for more and smaller sizes, the plant was doubled as to bin capacity, with the addition of more screening and recrushing equipment. The additional bins were constructed substantially and economically by using reinforced-concrete walls and bin bottoms, with a well designed timber superstructure.

The latest additions, which were made last year, consisted of a concrete stave silo, 16 ft. diameter by 40 ft. high, furnished by Neff and Fry, Camden, Ohio, for the storage and loading of agstone. At the same time the silo was being built a new work shop was constructed. This building is of concrete construction and equipped with a traveling crane, forges, work benches, stock room and other equipment that goes to make up a first class shop. There is ample floor space for four trucks, one locomotive, one steam shovel, one compressor and several small engines to occupy at the same time.

The product is used principally for highway material and concrete aggregates, and all deliveries are by truck.



Caterpillar type, gasoline engine driven blast hole driller and 3/4-yd. steam shovel used for stock piling and loading out. This is one of the shovels which can be used for removing overburden also

Because of its nearness to Dayton and the ease of truck delivery direct from the plant to any point in the city, the plant is in a position to supply that market advantageously. All of the standard sizes of crushed stone are produced, from No. 1 to No. 7, inclusive, according to the Ohio state highway department specifications. To take care of part of the deliveries, the company operates two Mack and two General Motors dump trucks of its own.

A ground storage of 25,000 to 40,000 tons of crushed stone is maintained adjacent to the plant to insure prompt filling of orders at all times. Each size is kept in a separate pile and is put into storage by dump trucks and piled up by a ¾-yd. Osgood caterpillar steam shovel, which is also used to load out to trucks.

Quarrying Operations

The limestone deposit is overlaid with an average of 4 ft. of overburden which is removed at intervals by either the ¾-yd. shovel from the storage or the 1-yd. shovel from the quarry, loading to trucks, which move it to a dump. Using four trucks and a total of nine men, as much as 400 to 500 cu. yd. per day have been moved at a direct cost of approximately 15c per cu. yd.

Drilling is done with a late model Loomis 44-GT caterpillar type gasoline-engine-driven, blast-hole drill with a 5⅝-in. bit, which drills about 90 ft. of hole per 10-hour day.

The stone is being quarried out to a depth of 28 ft. at present and the blast holes are spaced 9 ft. apart and 9 ft. back, and are staggered, giving about 6¾ tons of rock per foot of hole drilled. Several rows of holes are usually shot at one time, using 40% dynamite.

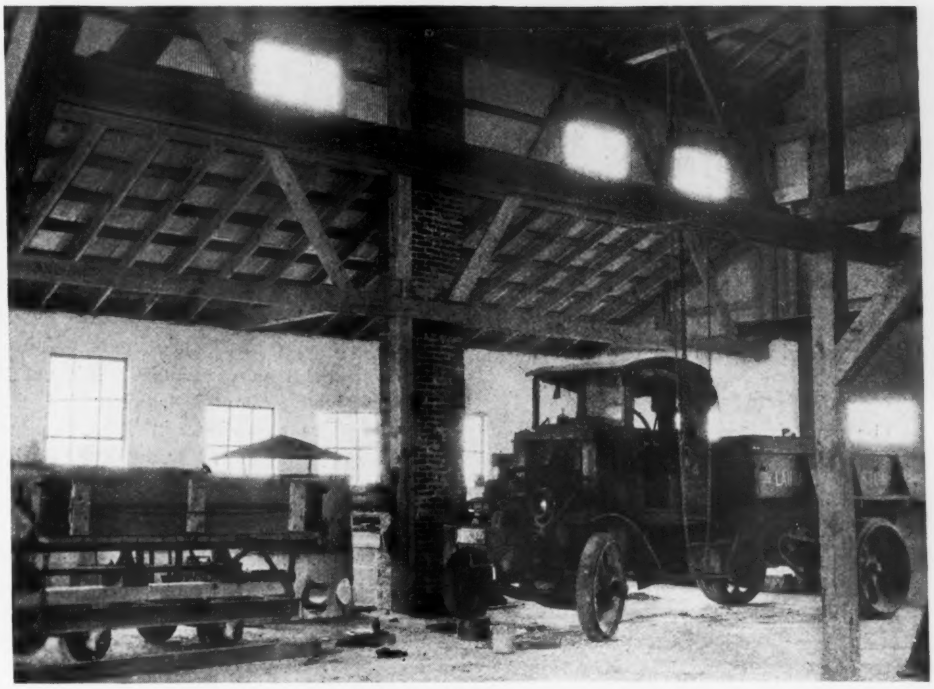
A 1-yd. Model 29 Osgood, caterpillar type, steam shovel loads the rock to 2-yd. Western type side-dump cars, four cars to a train, which are hauled to the foot of the incline

on 36-in. gage quarry track by a 3½-ton Plymouth gasoline locomotive.

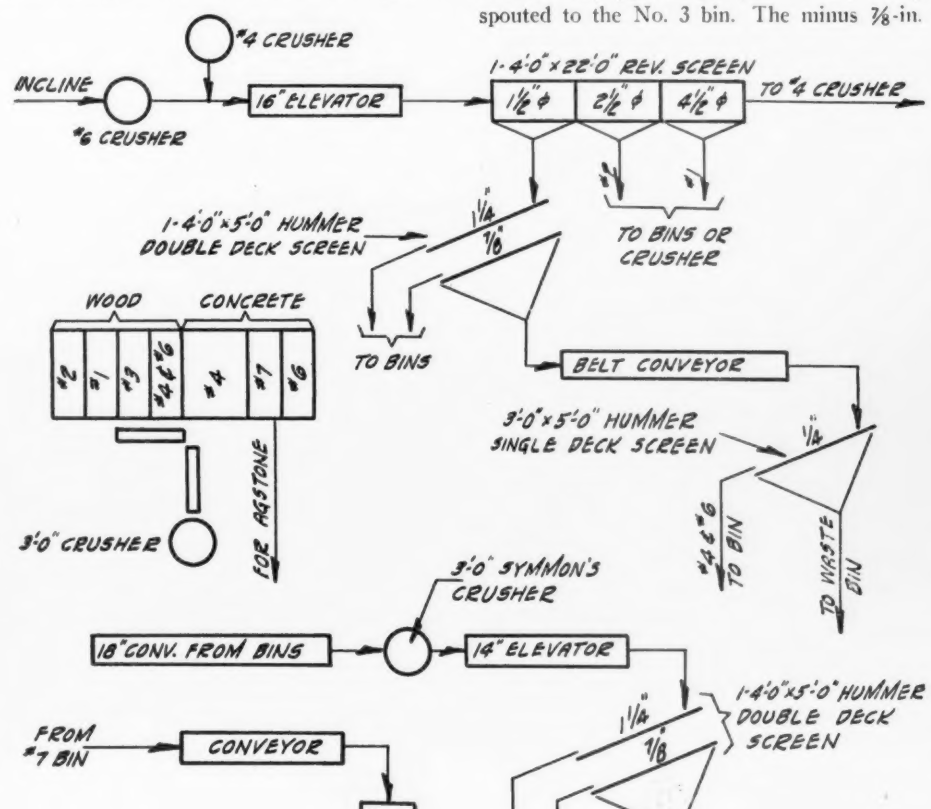
Crushing and Screening

The quarry cars are hoisted up the inclined track to the crusher, one at a time, by a friction hoist and wire rope and are dumped to a No. 6 Austin gyratory crusher. The crushed rock is then carried up in a 16-in. belt bucket elevator to a 4-ft. by 22-ft. revolving screen over the bins. This screen has no jacket and is equipped with 9 ft. of 1½-in. perforated screen plate, followed by 9 ft. of 2½-in. and 4 ft. of 4½-in. perforations. Any oversize is spouted back to a No. 4 Austin gyratory crusher located alongside the No. 6 and discharging to the same 16-in. elevator. The No. 1 and No. 2 sizes, 2½-in. by 4½-in. and 1½-in. by 2½-in., respectively, are spouted to the bins or to the recrusher.

The minus 1½-in. material passing through the first section of the revolving screen is spouted to a 4-ft. by 5-ft. double-deck, Hum-mer, vibrating screen below, with 1¼-in. mesh cloth on the upper deck and ⅞-in. mesh cloth on the lower deck. The upper deck of this screen is used to relieve the load on the ⅞-in. mesh deck and effect a clean separation, all material passing over this screen, ⅞-in. by 1½-in. size, being spouted to the No. 3 bin. The minus ⅞-in. material passing through drops on to a short belt conveyor which carries it over to a 3-ft. by 5-ft. single-deck, Hum-mer, vibrating screen with ¼-in. mesh cloth.

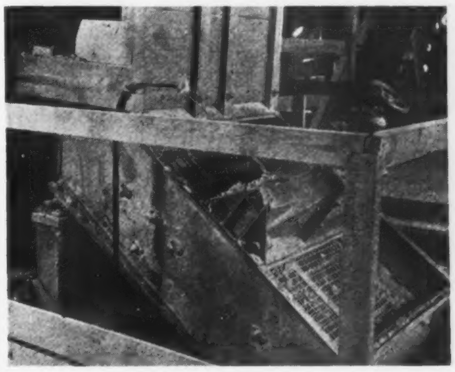


Interior view of the new shop erected at the Laura quarry. It is of cinder block construction



Flow sheet of the Laura Gravel and Stone Co. operation, Phillipsburg, Ohio

The mixed No. 4 and No. 6 sizes, ¼-in. by ⅞-in., passing over this screen are spouted to a No. 46 bin, while the minus ¼-in. material through the screen is spouted to a waste bin from which it is hauled to the dump. In this way these various sizes are cleaned and separated from any foreign matter, the fine sizes, as No. 7 and agstone, being produced in a further crushing separation.



Double-decked vibrating screen for separating recrushed material at the Laura plant

By means of an 18-in. belt conveyor alongside the bins containing the No. 3 size and the No. 4 and No. 6 sizes, either or both of these may be drawn from the bins and fed to a 3-ft. Symons cone crusher. From here the recrushed material is elevated in a 14-in. belt bucket elevator to a 4-ft. by 5-ft. double-deck, Hum-mer, vibrating screen located over the bins. This screen separates out the No. 4 size and the throughs are spouted to a

3-ft. by 5-ft. single-deck, Hum-mer, vibrating screen below, with ¼-in. mesh cloth, which separates the No. 6 and No. 7 sizes, each of which is spouted to a separate bin.

For making agstone, the No. 7 or minus ¼-in. size is drawn from its bin to a short belt conveyor feeding a small Gruendler hammer mill, and then conveyed and elevated to the top of the concrete stave silo. Here it is passed over a 2-ft. by 5-ft. Simplicity, vibrating screen with ⅛-in. mesh cloth, the throughs going into the silo and the rejects being spouted back to the hammer mill.

General Personnel

The plant is steam driven, all machinery being belt driven from the line shaft, except the four vibrating screens. Power for these screens is furnished by a belt-driven generator, and electric current for lighting is obtained from a second belt-driven generator

A total of 18 men, exclusive of truck drivers, are required to operate the plant, 6 in the quarry and 12 in and around the plant. The offices are at Phillipsburg, Ohio, also at the plant. Edward Mattis is president and superintendent; Walter J. Steiner is vice-president, and I. E. Baker is secretary-treasurer and general manager.

Results of Physical Tests of Road-Building Rocks

RESULTS of tests made by the United States Bureau of Public Roads up to 1928 on about 6000 rock samples from the various states are given in Miscellaneous Publication No. 76, July, 1930, of the United States Department of Agriculture. This information was compiled by D. O. Woolf, associate materials engineer, Division of Tests, Bureau of Public Roads, and includes values of hardness, toughness, per cent. of wear, absorption, and weight. Copies can be obtained at the price of 25 cents each from the Superintendent of Documents, Washington, D. C.

Artist Finds Inspiration for Canvas at Illinois Quarry

THOSE of us who question the fact that there is anything artistic in the appearance of a quarry will be interested in J. Jeffrey Grant's painting reproduced here, which was exhibited at the 36th annual exhibition of the Palette and Chisel Club of Chicago.

The plant of the Federal Stone Co. at McCook, Ill., was the inspiration for this painting which the artist has called "Industry." A reproduction of the canvas made a striking feature in the rotogravure section of the *Chicago Daily News.*

(Photo courtesy the Chicago Daily News)

Illinois crushed-stone plant offers subject for artist's conception of "Industry"

Notes on Sand and Gravel Plant Design and Equipment

Part IV—Modern Sand and Gravel Pumping or Dredging Plant Layouts Using the Cylindrical Type Washing Screen

By A. L. Munro and D. D. Barnes
Chief Engineer and Sales Manager, Respectively, Smith Engineering Works, Milwaukee, Wis.

PARTS I, II and III (ROCK PRODUCTS, May 12, 1928, July 21, 1928, and March 30, 1929) of this article showed and discussed several modern sand and gravel plant layouts using the cylindrical type washing screen. Parts I and II described plants with the receiving hopper located at ground level for use with drag scrapers, cars loaded by shovel or dragline, or with a field conveyor loaded by shovel or dragline. Part III covered layouts with the plant receiving hopper located on top of the plant for use with cableway excavator outfits.

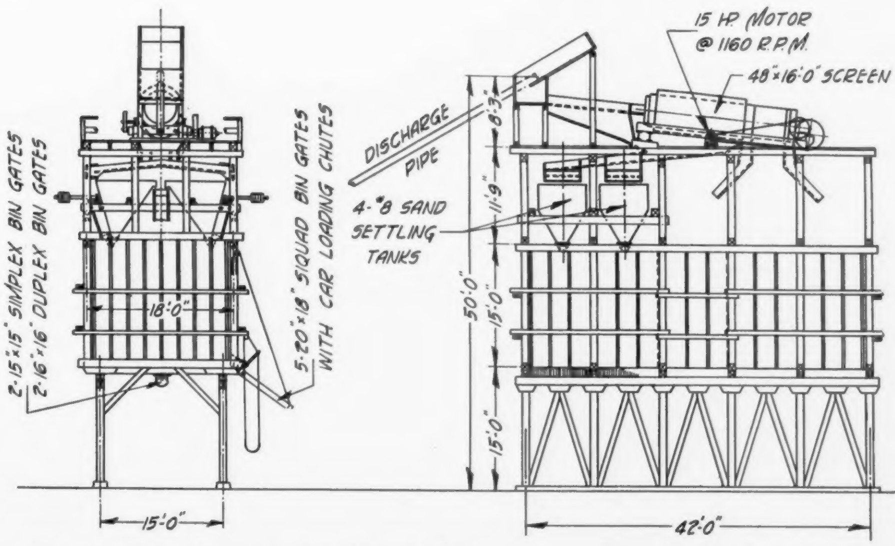


Fig. 11. Side view and elevation of plant, same as shown in Fig. 10, using bins instead of ground storage

This last article of the series deals with various types of plants using a pump or dredge as the excavating means. It also shows and describes a layout applicable to very dirty pits, where clay balls are encountered and where the material requires strenuous treatment to produce clean aggregate.

Dredging Plants

Dredging or pumping plants may be divided into two classes: (1) Floating plants or those with the pump, power, screens, crusher, sand recovery devices, complete operating crew, etc., all located on a large floating barge or boat, making a complete self-contained plant which can deliver finished aggregate direct to scows alongside for water transportation to the market; (2) shore pumping plants, or those with the pump and its power located on a smaller floating barge but with the pump discharge line extended to a stationary crushing, washing and screening plant erected on the shore at a permanent location for delivery into trucks or railroad cars. It is the latter type of shore pumping plant that this article discusses.

In plants of this kind the dredge is generally a standard type unit consisting of pump with either electric, oil or gasoline power. Only the smaller units use gasoline engines. The larger units employ either electric or oil-engine power. The pump suction line is sometimes equipped with a mechanically operated cutter for loosening the material. A hoist, usually power operated, is required to raise and lower the suction line and to move the dredge. The discharge line is equipped with flexible joints and mounted on pontoons between the dredge and shore. This type of excavating unit differs from all others in that it delivers a large supply of water to the plant with the material. It also gives the material a good scrubbing and washing action while going through the pump and pipe. For these reasons, the design of the sand and gravel plant proper must be different from the ordinary outfit.

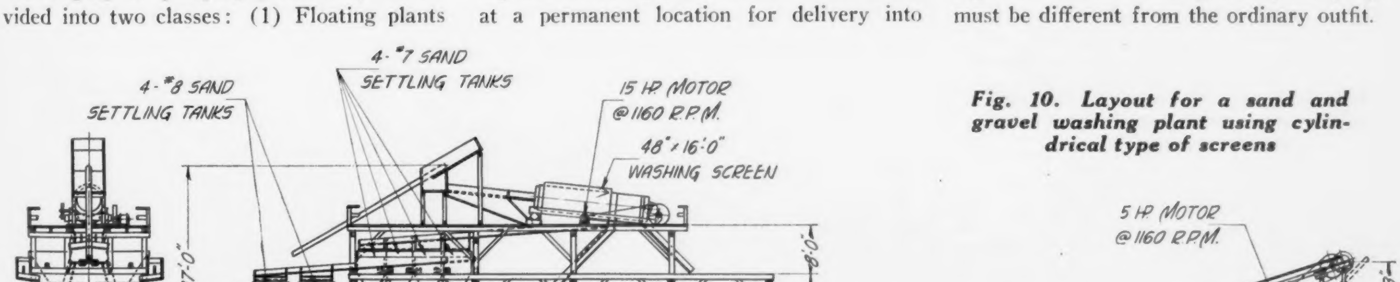


Fig. 10. Layout for a sand and gravel washing plant using cylindrical type of screens

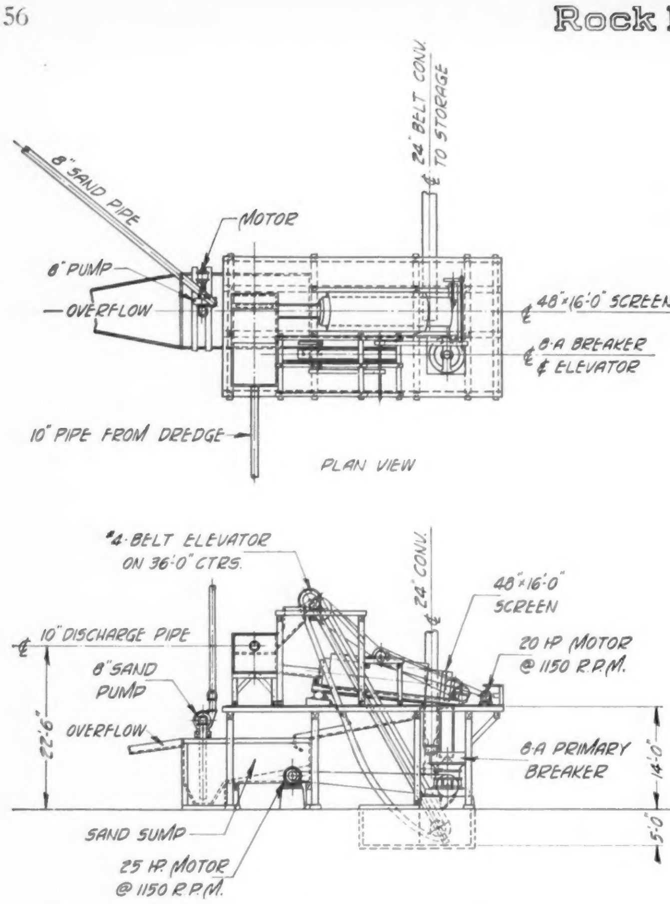


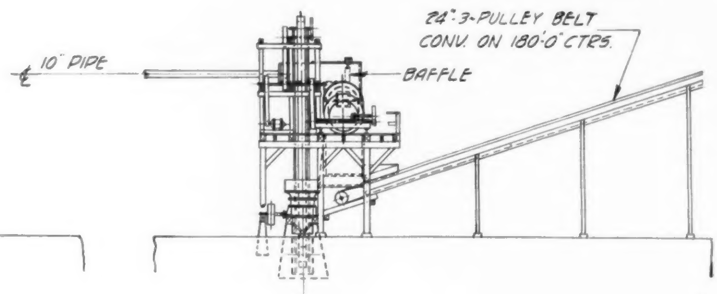
Fig. 12, above. Proposed arrangement of lower end of dredging plant

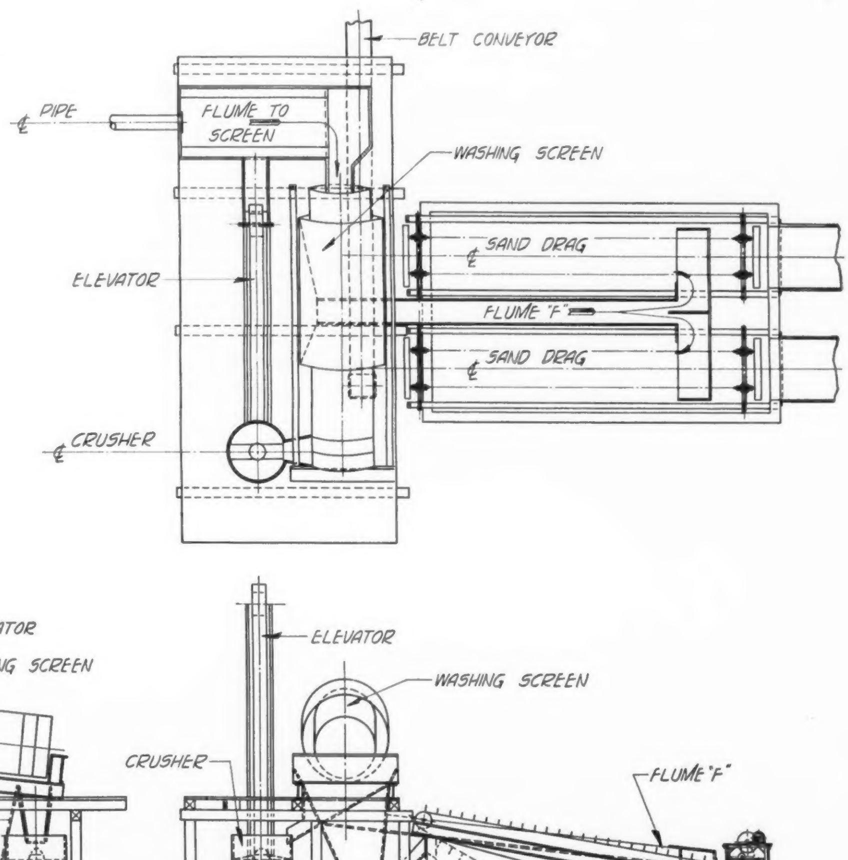
Shore Plant Details

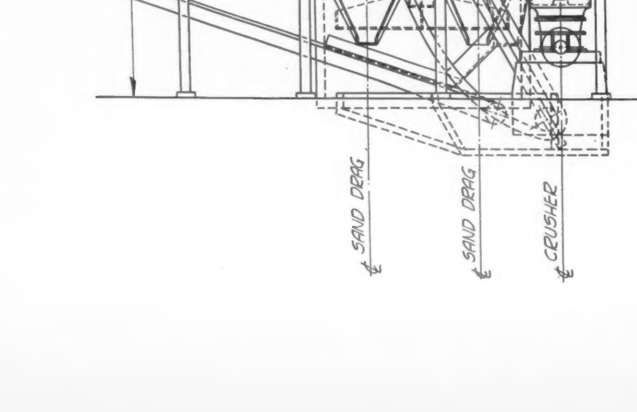
Shore plants for handling dredged or pumped material may also be divided into two classes: (1) The simplest type, where the pump discharge line delivers the material directly to the top of the plant—this type is generally employed for smaller capacities and where the dredge can be kept close to the screening plant; (2) the more complicated type, where the pump discharge line delivers the material at or only slightly above ground level. This type is generally used for the larger capacity plants and where the dredge must excavate material from a large area some distance from the screening plant. In operations of large capacity, where the dredge must pump the material through a long discharge line, excessive power requirmeents prohibit pumping direct to the top of the plant, due to the additional head imposed on the pump. In some cases this is accomplished by means of a booster pump, but that method is not often used, due to the large power expenditure.

In plants of the first type, where the pump delivers material directly to the top of the plant, it is desirable, in order to reduce power consumption, to have the screening plant as near to the ground as possible and yet have sufficient storage under the screens and tanks. To meet these conditions, the ground storage type of plant fits in very nicely.

A plant of this kind, using the cylindrical type washing screen, is shown in Fig. 10. Only the discharge end of the pipe line from the dredge is shown on the drawing. This delivers the sand, gravel and water to a receiving box, designed to reduce the velocity of the flow. The stream is flumed from this point to a cylindrical type washing screen. The sides of this flume are perforated to







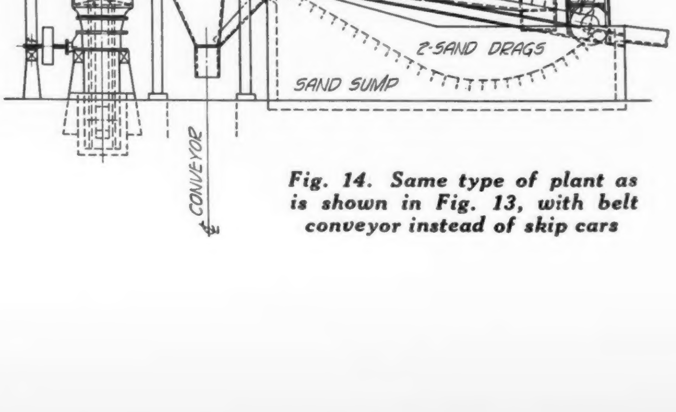


Fig. 14. Same type of plant as is shown in Fig. 13, with belt conveyor instead of skip cars

pass part of the water and sand directly to the sand settling tanks. This prevents an excess of water in the washing screen and insures a proper separation of material.

The 48-in. diameter by 16-ft. cylindrical type screen, equipped with a 12-ft. long sand jacket, separates three sizes of gravel, which are chuted direct to storage piles on the ground. The sand-laden water going to the screen passes through the sand jacket and down a flume to the sand tanks. The screen has no scrubber but is equipped with special baffles to retard the flow of material through the screen. These are necessary, due to the large volume of water.

In a pumping plant a large number of sand tanks are required, due to the large volume of water to be handled. The number used is determined by their water capacity rather than their sand capacity. In this plant, four No. 7 (Telsmith) sand tanks are used to recover the coarse or concrete sand and four No. 8 sand tanks are employed to recover the fine sand. A belt conveyor, located in a tunnel beneath the stockpiles, is used to reclaim the aggregate from storage and deliver direct to trucks or railroad cars.

This plant again shows the many advantages of the cylindrical type washing screen. It is all on one frame, a complete unit, requiring a single drive belt. A very simple structure is required to support it. Chute and flume construction is not at all complicated, and it is an easy matter to mix the various grades of gravel, if desired. All storage piles are the same capacity. In a plant of this kind a steel frame screen is preferred, as no warping or misalignment can take place.

Only two motors are required for this type of plant—one drives the washing screen and the other the conveyor. The dredge, of course, is provided with its own power unit.

Fig. 11 shows a plant of the same type, but using bins instead of ground storage. Here again it is necessary to keep the screen as low as possible, which allows very little bin capacity. Where it is easy to keep a day's supply of railroad cars or of trucks ahead of the plant and where it is easy to balance orders, the small bin storage is no great handicap. This is not always possible, so that the ground storage plant shown in Fig. 10 is generally more practical.

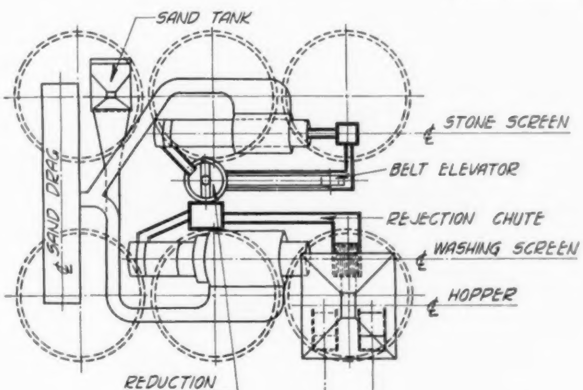
Crushing Units

The plants shown in Figs. 10 and 11 have no facilities for crushing oversize gravel. Where this feature is desired, a crusher of any size or capacity can be easily added to these layouts. When this is done, an elevator is also necessary to carry the crushed product back up to the screen for rewashing and resizing.

In the larger capacity shore plants of pumping operations, crushing of oversize rock is nearly always necessary, so the following layouts showing this type of plant, where the pump delivers at or slightly above ground level, will include crushing facilities.

Fig. 12 shows the lower part of a plant and how one method of separating the sand and water from the gravel and crushing the oversize is accomplished. The 10-in. pipe from the dredge discharges into a receiving box to reduce the velocity of flow. A flume carries the material from this box to a 48-in. diameter by 16-ft. cylindrical scalping screen. This is equipped with a sand jacket about 14 ft. long, with about ¼-in. holes.

If everything, say over 2-in., is to be crushed, the main barrel of this screen should be perforated with 2-in. holes. The following separations then take place: The gravel passing the 2-in. holes and rejected by the ¼-in. sand jacket goes directly to the belt conveyor and on up to the main plant for final separation. Everything over 2 in. in size goes to the gyratory crusher. This crusher discharges to a short belt elevator which takes the crushed product back up to the screen for rewashing and resizing. The sand-laden water, passing through the ¼-in. sand jacket, is flumed to a sump, where the sand settles out and the excess water flows off. A small sand pump is provided to elevate the sand to the top of the main plant, where it is rewashed and separated by means of tanks. The final screening section of this plant is not shown, but can be made of standard design, with the sand tanks for dewater-



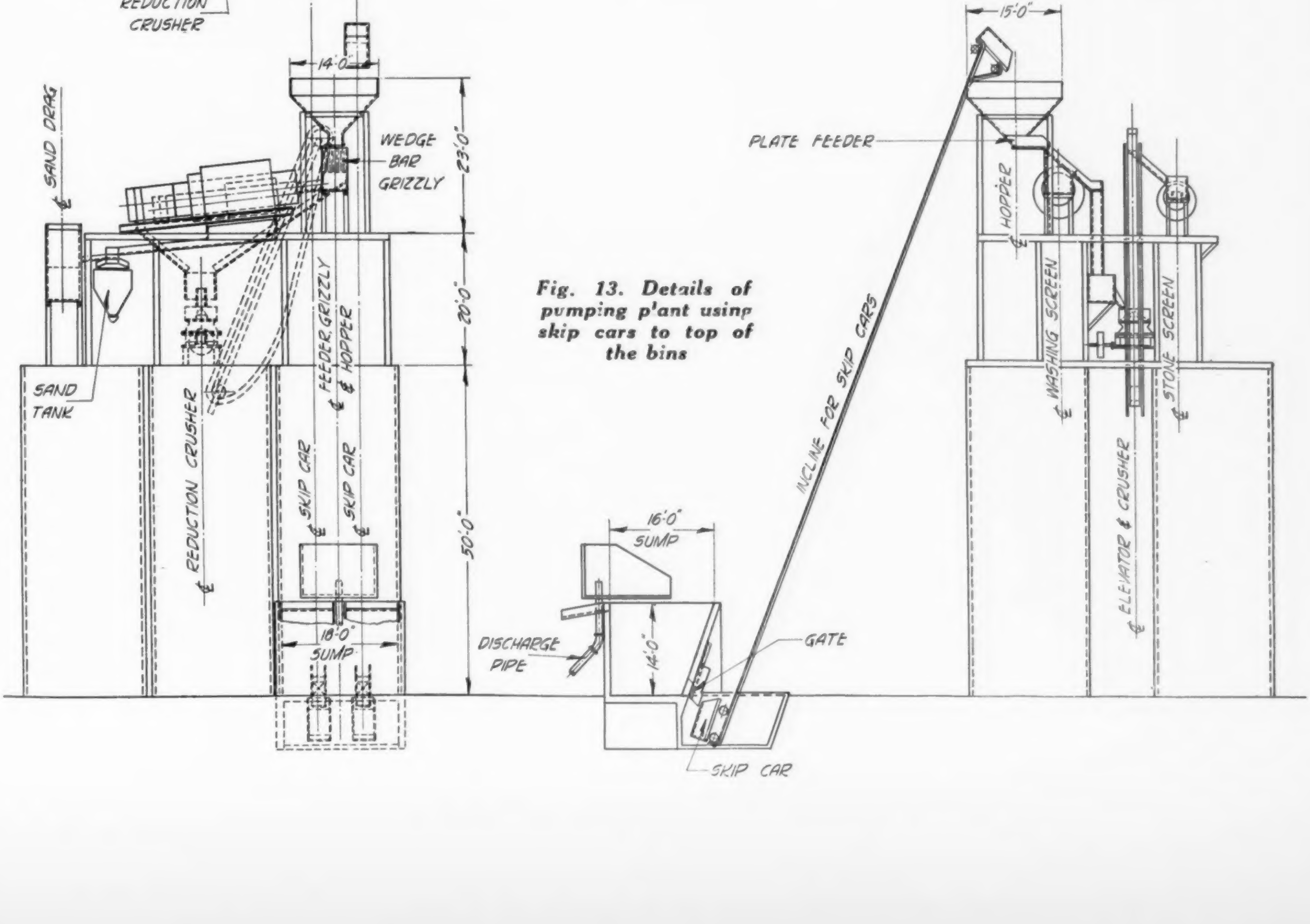


Fig. 13. Details of pumping plant using skip cars to top of the bins

ing and recovering the sand, and a cylindrical screen for rinsing and screening the gravel.

Fig. 13 shows another method of handling the product from a pump of large capacity. The discharge from the pump flows into a large sump, usually concrete, equipped with hand- or air-operated gates at the bottom. The sand and gravel settles to the bottom of this sump and the excess water runs off through an overflow. The gates in this sump discharge into a set of balanced skip hoists which elevate the material and discharge it into a hopper on top of the plant. This hopper is equipped with a feeding device and the arrangement of screens, power, crushers, sand tanks, etc., is very much like the usual type of cableway excavator plant described in previous articles.

Handling Pump Discharge

Fig. 14 shows about the best and most economical method of taking care of the discharge from a dredge or pump, dewatering the product, crushing the oversize and taking away the products for final rinsing and separation. It is very much like the layout shown in Fig. 13, except with a different means of taking care of the sand. In this layout, the sand-laden water passing through the sand jacket of the cylindrical screen passes down the flume, *F*, to a large sump, usually made of concrete. This sump is equipped with one or two sand drags which drag the sand up and out of the sump, dewater it, and discharge it to the same conveyor handling the gravel. The sand and gravel then goes up to a cylindrical screen located over bins or storage piles, for final separation into sand and the various grades of gravel. A small amount of water is used in this final screen to rinse the gravel and to separate and carry the sand to the sand tanks.

In all of these layouts the advantages of the cylindrical type screen are well demonstrated. The main advantage in connection with pumping plants is the saving of headroom, which keeps down power requirements on the pump. Installation expense is kept to a minimum because of the very simple and uniform supports required for this type screen. As the screen is a complete unit, all on its own separate frame, misalignment of screen and drives cannot take place. This results in minimum upkeep expense. Chute construction is of the simplest kind and chutes are quickly and easily accessible for adjustment or repair. This type screen also makes it possible to readily mix various sizes of gravel. This feature is a very necessary and valuable one. With the cylindrical type screens, bins or stockpiles can all be made the same size because of the uniform and simple construction required to support it. Better distribution of different sizes can be obtained. The scrubber, gravel screens and sand jacket are all in one unit on a separate wood or steel frame requiring the simplest kind of drive and minimum power.

Cleaning Especially Dirty Materials

As a conclusion to this series of articles, a plant suitable for washing, crushing and screening very dirty materials will be illustrated and described. The method used can be applied to almost any type of plant, whether it be supplied with shovel, dragline, cableway excavator, drag scraper or pump. The plant we will describe is equipped with receiving hopper. The raw material is excavated by shovel and brought to the plant receiving hopper by industrial cars.

The ordinary type of sand and gravel washing equipment is not capable of breaking up and getting rid of a large percentage of hard clay balls. Neither will it disintegrate and wash out soft rock. A pit containing this kind of material requires extra strenuous treatment with a special type of equipment. Fig. 15 shows a plant containing the necessary extra equipment to give this sort of treatment.

Material containing a great deal of clay is very sticky, and even the receiving hopper must be of special design. The sides of the hopper must be almost vertical and should be lined with steel. This requires some additional height in order to get the ordinary capacity in the hopper. The feeder should also be wider than ordinary. An apron feeder is sometimes used, although maintenance cost is high in handling moist gravel.

The material fed to a belt conveyor by the feeder is carried up to a rail bar grizzly, where all large boulders are rejected direct to the primary crusher. Material passing the grizzly goes to a heavy-duty cylindrical type scalping screen equipped with about 2-in. or 2½-in. round holes. Oversize from this scalper goes to a reduction crusher.

The product from both crushers is taken by a belt conveyor back to the main conveyor and again goes through the scalping screen for resizing.

All material passing the scalping screen drops into a hopper where a good volume of water is applied, washing it down into a set of log washers. These "logs" break up and wash out the clay balls, discharging clean gravel to another belt conveyor. The sand overflowing from the log washers with the

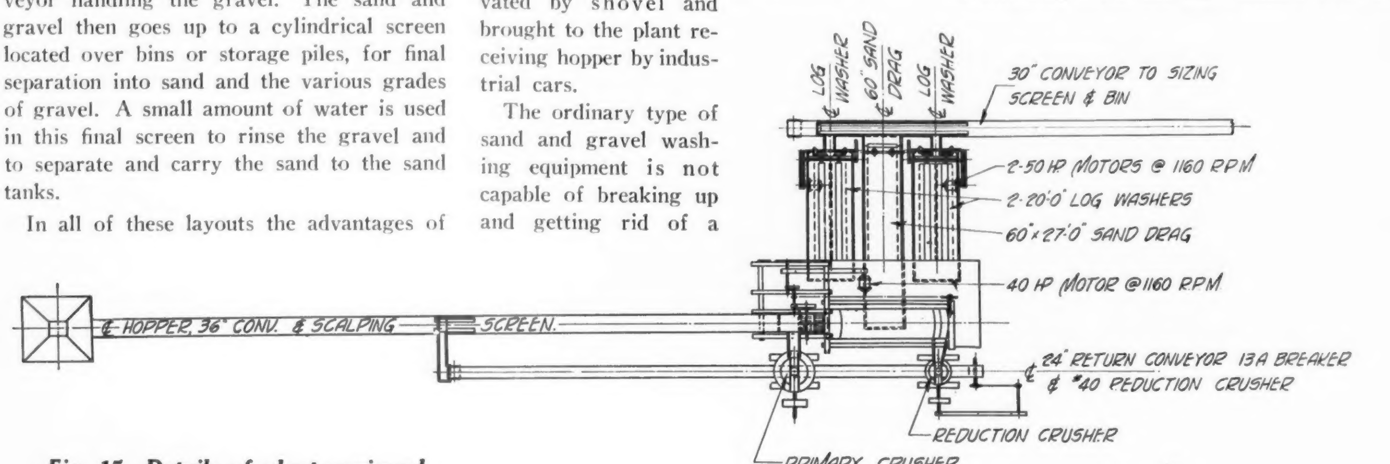
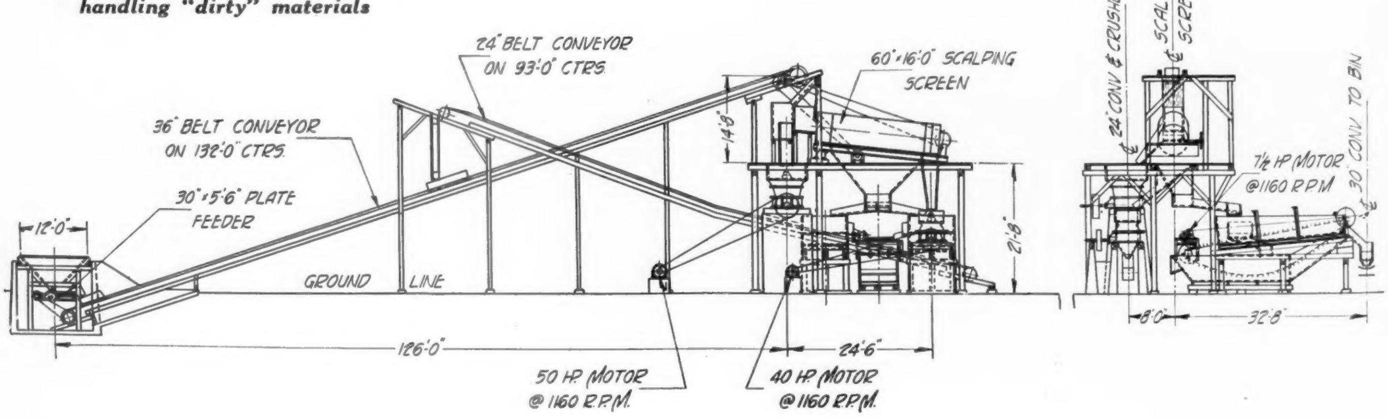


Fig. 15. Details of plant equipped with necessary extra equipment for handling "dirty" materials



water is recovered by a sand drag, which discharges clean sand to the same belt conveyor with the clean gravel. This conveyor delivers the sand and gravel to another washing screen located over bins or storage piles. The final screen should also be the cylindrical type, equipped with scrubber, sand jacket and gravel screening sections. A fresh supply of water is added in this screen to again scrub and rinse the gravel and to flume the sand to tanks or sand drags.

Where this type of plant is used on a pumping proposition, the receiving hopper, feeder and first belt conveyor are not necessary. The pump should discharge into a large concrete sump where the aggregate settles and the excess water flows off. A digging elevator may be used to excavate the sand and gravel from the sump and elevate it to the bar grizzly over the first crusher. The return conveyor, carrying the crushed product from the two crushers, will discharge back into the sump at the foot of the digging elevator.

A plant with these special features is of course much more expensive than the ordinary outfit, and requires a great deal more power. The cost of producing sand and gravel in a plant of this kind is therefore likely to be higher than in the ordinary pit. The market and prices obtainable for sand and gravel should therefore be carefully investigated before undertaking the development of a dirty deposit. Even though clean material can be produced, the cost may be too high as compared with competitive plants in the same vicinity working on ordinary material. On the other hand, good pits are becoming very scarce in some localities, and pits containing hard clay and other extraneous matters must soon be resorted to in order to obtain concrete aggregate. Under these conditions the plant described offers a means of making these dirty pits usable.

The writers of this series of articles hope that they have been of some value to the readers of Rock Products. If any details regarding the plants described or the equipment involved are not understood, we will be very glad to answer questions.

Production of Bentonite

BENTONITE IS A natural hydrous silicate of alumina having the distinctive property of forming a highly viscous solution, gel or sol, in the presence of not less than 10 times its weight of water. Chemically it may be represented by the formula $Al_2O_3{\cdot}4SiO_2{\cdot}XH_2O$, this varying somewhat with the different deposits. The alumina may be replaced to some extent by iron, calcium or magnesium, and slightly by alkalies.

According to Bulletin No. 107, issued by the Silica Products Co., Kansas City, Mo., two-thirds of the true bentonite is produced in Wyoming, most of the balance in Nevada, and a small amount in Utah and California. Some has been found in Montana and Canada, but none east of the Rocky Mountain area. The material was named "bentonite" because it existed largely in the Fort Benton formation of the Upper Cretaceous of Wyoming. It has been known in that section since 1885, and there has been some production for at least 40 years, but this has been expanded only in recent years.

Exclusive of the so-called bentonites used in oil refining and for similar purposes which do not depend upon colloidal or gel producing properties, 30,000 tons were produced in 1929. It is commonly called mineral soap or soap clay, and occurs with lava beds in the Upper Cretaceous formation.

The outcroppings of bentonite are characterized by a curly or crinkly appearance of the soil, due to the contraction and expansion from alternate dry weather and rain. It has probably been produced along with volcanic ash by the decomposition of lava or related igneous matter through the action of water in a manner similar to the formation of kaolin from feldspar by the action of carbon dioxide.

Physically the crude bentonite found in Wyoming is usually a greenish-colored waxy or soapy material with a tendency toward a conchoidal fracture. The bentonite in Nevada is usually white, pink, yellow or gray in color. After drying it is grayish white and very fragile, and is easily crushed in the fingers.

It is no more hygroscopic than any other inert powdered argillaceous material, but has a great physical avidity for liquid water, and it is this feature that is distinctive and gives to it its principal physical properties and commercial uses. Its gel forming property is very much increased by the addition of a small amount of magnesium oxide or other substance of about the same alkalinity. Dry bentonite mixed with 2% of magnesium oxide will form a stiff gel with 25 times its weight of water.

The particles of bentonite are much smaller than the particles of ordinary clay and the extremely small size of the particles causes the colloidal suspension, sols and gels. When mixed with water in proportions of more than 5% a stiff paste or gel is formed, and below that proportion a thin suspension or colloidal sol. Small amounts of hydroxyl ions increase greatly the tendency to form gels, so that inferior grades of bentonite may be improved by the addition of small amounts (1 to 4%) of caustic soda. It is capable of taking on and giving up water repeatedly without deterioration and its gel-producing power is reversible when not heated above approximately 400 deg. F.

The comparative value of different bentonites or clay-like materials thought to be bentonite may be determined by drying at not over 220 deg. F. a 50-gram sample and powdering it to completely pass 200-mesh and then mixing with 5% of magnesium oxide. Four grams of the mixture are put into a 4-oz. round bottle, 100 cu. cm. of distilled water added, and placed in a shaking machine one hour. It is then allowed to stand 24 hours. A good bentonite will give a fairly stiff gel which will not break on inverting the bottle. Any clear liquid on top may be siphoned off and this amount subtracted from 100 gives roughly the value of the sample in percentage; in other words, the amount of gel formed is a measure of the value. Ordinary clay and similar materials will not have a value over 10%. Anything giving a gel over 50% may be considered as bentonite.

The principal uses of bentonite are as a binder with a variety of materials such as foundry sands, refractories, ceramic products, graphites, chemicals for gasoline treating, etc.; as emulsions and mastics; for water treatment, and for a number of other purposes. It is also used in the manufacture of various cements, and with lime gives pozzolanic effects.

The Wyoming bentonite is largely produced from the northeastern and the southern parts of the state. The Silica Products Co. operates at Clay Spur, Wyo., and at Beatty, Nev. The raw material occurs in strata from 1 to 4 ft. thick, usually covered with some overburden which is removed with scrapers, or steam shovels, in the case of a thick covering. Hand excavating and loading with pick and shovel is preferred to steam shovel, as it keeps out impurities. It is hauled to the plant in small industrial type cars or trucks, which are dumped to a hopper, and the material is then elevated to rolls or cutters which break it down to a size suitable for drying.

Rolls work well for this except when it is wet and gummy, but they must operate at different speeds in order to get a tearing action. Self-cleaning cutters are also used.

The crude bentonite sometimes contains up to 35% moisture. From the rolls or cutters it is passed over screens and the minus ⅜-in. material carried over to the dryers, while the oversize is returned to the rolls for further reduction. Indirect heat dryers are used with either steam or hot gases and the temperature is preferably kept down to about 250 deg. F. The cost of this crushing and drying is about $3 per ton.

After drying it is ground to a fineness of 85% minus 200-mesh for ordinary purposes, but for some special uses is ground down to such a fineness that 99% will pass a 300-mesh screen. No impact is necessary in the grinding operation because of the softness of the material, a rubbing or attrition action being desirable. However, practically all types of mills have been used successfully, including ball mills, tube mills, rod mills and other types of mechanical mills.

After pulverizing it is packed in cloth or paper bags. It is not hygroscopic and does not take up moisture from the air or tend to pack in the bags any more than other finely ground material. The crushed dried bentonite is sold in bulk in carload lots at $14 per ton, f.o.b. plant, while the pulverized material (85% minus 200-mesh), packed in 100-lb. bags, is sold at $20 per ton.

Recent Japanese Research in Portland Cements

Reviewed for Rock Products

By William A. Ernst
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STUDIES ON CALCIUM FERRITES AND IRON CEMENTS

By SHOICHIRO NAGAI and KATSUHIKO ASAOKA

Calcium ferrites or compounds between iron oxide and lime have been previously reported by a number of investigators as being nearly equal to calcium aluminates or compounds between alumina and lime. Replacing the alumina in the four calciuminates $3CaO \cdot Al_2O_3$, $5CaO \cdot 3Al_2O_3$, $CaO \cdot Al_2O_3$, and $3CaO \cdot 5Al_2O_3$, they reported $3CaO \cdot Fe_2O_3$, $2CaO \cdot Fe_2O_3$, $2CaO \cdot 3Fe_2O_3$, $CaO \cdot Fe_2O_3$, $2CaO \cdot 3Fe_2O_3$, etc. But R. B. Sosman and H. E. Mervin (*Journal Wash. Acad. Sci.* 1916, 6, 542; Wilson: *Ceramics—Clay Technology*, 248) reported only two ferrites, $2CaO \cdot Fe_2O_3$ and $CaO \cdot Fe_2O_3$.

It is an important problem for the discussions of combinations between acid oxides as silica, alumina and iron oxide and basic oxide as lime in portland cement, that the calcium ferrite is $3CaO \cdot Fe_2O_3$, or $2CaO \cdot Fe_2O_3$ in the clinker of high lime content as portland cement. The present author (S. Nagai) discussed formerly (*Journal of the Society of Chemical Industry, Japan*) 1929, 32, 236 and 243 various indices and moduli between acid oxides and basic component of portland cement, as (1) molar ratio of lime to silica, (2) lime silica ratio, (3) molar ratio of $3CaO \cdot SiO_2$ to $2CaO \cdot SiO_2$, etc.

In the present paper, the authors studied systematically, the combination between iron oxide and lime in the high lime mixtures as $3(CaO)1(Fe_2O_3)$, $5(CaO) : 1(Fe_2O_3)$, etc., and determined the ferrite of the highest lime content to be $2CaO \cdot Fe_2O_3$ and not $3CaO \cdot Fe_2O_3$. Therefore it is quite correct that the factor 0.70 of $2CaO \cdot Fe_2O_3$ was adopted in the calculations of the preceding indices or moduli.

The important results of the above studies are as follows: (1) The mixture of $3(CaO) : 1(Fe_2O_3)$ was heated at various temperatures above 900 deg. C. and the heated product was examined on various points as specific gravity, free lime insoluble residue to 0.5 normal HCl, molar ratio of combined lime to combined ferric oxide, etc. By comparison of these points the combination between ferric oxide and lime was clearly explained. The results are tabulated in the following Table I.

Dicalcium ferrite $2CaO \cdot Fe_2O_3$ dissolves easily in 0.5 normal HCl, but the monocalcium ferrite $CaO \cdot Fe_2O_3$ remains in the insoluble part. Therefore, the molar ratio of combined lime to ferric oxide was smaller than that of the theoretical value, in the heated products F303 (1100 deg. C.) and F304 (1200 deg. C.), owing to the formation of $CaO \cdot Fe_2O_3$ and remaining in the insoluble part. But this ferrite disappeared in the products F305, F306 and F307, which were heated at above 1300 deg. C. and changed perfectly to $2CaO \cdot Fe_2O_3$. This was decidedly shown by the value of the molar ratio of combined lime to combined ferric oxide.

The mixture of $5(CaO) : 1(Fe_2O_3)$ was treated by the same heating method applied in the above section.

In continuing the previous study, the authors reported on (1) preparation of pure dicalcium ferrite, $2CaO \cdot Fe_2O_3$ by extraction of free lime from the heated products of mixture $3(CaO) : 1(Fe_2O_3)$ or $5(CaO) : 1(Fe_2O_3)$ in the first paper; (2) formation of monocalcium ferrite $CaO \cdot Fe_2O_3$ and (3) fractional dissolution of $2CaO \cdot Fe_2O_3$ and $CaO \cdot Fe_2O_3$ from the heated products of mixture of $2 \times 2CaO \cdot Fe_2O_3 + CaO \cdot Fe_2O_3$ ($5CaO \cdot 3Fe_2O_3$) or $2CaO \cdot Fe_2O_3 + CaO \cdot Fe_2O_3$ ($3CaO \cdot 2Fe_2O_3$). The brief summary of the paper is as follows:

(1) Free lime in the heated product of mixture of $3(CaO) : 1(Fe_2O_3)$, as F305, F306 or F307 in the first paper was extracted by the anhydrous glycerine-alcoholic solution of ammonium acetate.

The mixtures of $2CaO \cdot Fe_2O_3$ and free lime obtained by heating the mixture $3(CaO) : 1(Fe_2O_3)$ at 1350 deg. C. or 1550 deg. C. and the pure $2CaO \cdot Fe_2O_3$ was obtained by extracting the free lime from the above raw mixtures and examined on various points, as specific gravity, free lime, combined lime and ferric oxide, molar ratio of lime to ferric oxide, etc. The results were compared in table (1).

The extracted $2CaO \cdot Fe_2O_3$ in F210 or F211 was strictly equal to that of F208 or F209 in the first report. Therefore, it is decidedly clear that $2CaO \cdot Fe_2O_3$ is the ferrite of highest lime content, even in the case

TABLE I—HEATING TEST OF MIXTURE $3CaO : Fe_2O_3$

No.	Heating temperature	Heating time	Loss on ignition %	Free CaO %	Combined CaO %	Insol. Fe_2O_3 0.5N HCl %	Soluble Fe_2O_3 0.5N HCl %	Molar ratio CaO : Fe_2O_3	Specific gravity	Total dicalcium ferrite %
F301	900 deg. C.	60 min.	28.58	51.03	0.24	41.63	6.07	0.11	3.85	6.18
F302	1000 deg. C.	60 min.	28.82	47.03	2.42	41.63	8.75	0.79	4.00	9.54
F303	1100 deg. C.	60 min.	29.03	41.98	4.75	40.19	13.08	1.04	3.84	18.82
F304	1200 deg. C.	60 min.	29.03	30.64	14.07	31.93	23.35	1.71	3.93	40.07
F305	1300 deg. C.	60 min.	29.09	18.42	32.88	0	48.70	1.92	3.79	81.58
F306	1350 deg. C.	60 min.	29.09	16.60	34.70	0	48.70	2.03	3.82	83.40
F307	1400 deg. C.	60 min.	29.05	15.73	35.57	0	48.70	2.08	3.81	84.27

TABLE II—EXTRACTION OF FREE LIME AND PREPARATION OF PURE $2CaO \cdot Fe_2O_3$

No. of sample	Heating temperature	Heating time	Specific gravity	Free CaO	0.5N-HCl insol. res.	Comb. CaO	Combined Fe_2O_3	Molar ratio CaO : Fe_2O_3
F308	1350 deg. C.	60 min.	3.84	16.20%	0	35.08%	48.66%	2.05
F309	1550 deg. C.	60 min.	3.71	29.70	0	29.00	41.17	2.01
F210	Extracted lime from F308		3.94	0	0	41.66	58.30	2.04
F211	Extracted lime from F309		3.91	0	0	41.36	58.20	2.03

TABLE III—HEATING TEST OF MIXTURE $1(CaO) : 1(Fe_2O_3)$

No. of sample	Heating temperature	Heating time	Ignition loss	Specific gravity	Free lime (CaO) in % of Total lime	Free lime (CaO) in % of Heated product
F101	900 deg. C.	60 min.	16.98%	4.27	99.98%	25.10%
F102	1000 deg. C.	60 min.	17.12	4.41	80.63	20.94
F103	1050 deg. C.	60 min.	17.13	4.41	71.06	18.46
F104	1100 deg. C.	60 min.	17.34	4.34	55.73	14.47
F105	1100 deg. C.	300 min.	17.49	4.40	35.05	9.11
F106	1150 deg. C.	60 min.	17.21	4.42	33.88	8.81
F107	1200 deg. C.	60 min.	17.24	4.60	00.00	0.00

TABLE IV—SOLUBILITY OF $CaO \cdot Fe_2O_3$ IN HYDROCHLORIC ACID

No. of experiment	Variety of sample	Concentration of HCl	Insol. res.	Free lime	Soluble lime	Soluble ferric oxide	Molar ratio $CaO:Fe_2O_3$
a	F107	0.5 normal	83.91%	0%	3.99%	11.92%	0.95
b	Residue of a	1.0 normal	65.71	0	4.56	12.93	1.00
c	Residue of b	2.0 normal	14.69	0	13.19	37.54	1.00
d	Residue of c	3.0 normal	00.00	0	4.25	10.44	1.15

TABLE V—SEPARATION OF $2CaO \cdot Fe_2O_3$ AND $CaO \cdot Fe_2O_3$ FROM MIXED PRODUCTS

No. of sample	Heating temperature	Heating time	Ignition loss	Specific gravity	Free lime	Insol. res.	Sol. CaO	Sol. Fe_2O_3	Molar ratio $CaO:Fe_2O_3$
F331	1200 deg. C.	60 min.	22.94%	4.05	10.62%	40.64%	30.32%	28.91%	1.95
F332	1350 deg. C.	60 min.	22.90	3.98	0.0	19.32	31.62	48.97	1.84
F321	1200 deg. C.	60 min.	21.54	4.35	15.18	55.60	27.33	39.49	2.04
F322	1300 deg. C.	60 min	21.56	4.18	0	35.14	25.33	39.49	1.83

TABLE VI. FRACTIONAL DISSOLUTION OF $2CaO.Fe_2O_3$ AND $CaO.Fe_2O_3$ BY HCl OF DIFFERENT CONCENTRATION

No. of experiment	Variety of sample	Concentration of HCl	Free lime	Insol. res.	Soluble lime	Soluble ferric oxide	Molar ratio $CaO:Fe_2O_3$
A	F532	0.4 normal	0	19.32%	31.62%	48.97	1.84
B	Residue of A	0.8 normal	0	4.44	3.80	10.96	0.99
a	F322	0.4 normal	0	35.14	25.33	39.49	1.83
b	Residue of a	0.8 normal	0	14.56	5.04	15.28	0.93

of heating the lime rich mixture to its melting temperature as F309.

(2) Monocalcium ferrite $CaO \cdot Fe_2O_3$ was prepared by heating the mixture $1(CaO):1(Fe_2O_3)$ and the systematic studies on heated products were performed as shown in the following Table III. But in the present case, the determination of free lime was the most valuable point, and it was impossible to determine the percentage of iron oxide of combined or free state, owing to the property of $CaO \cdot Fe_2O_3$ insoluble in 0.5N-HCl and only soluble in more concentrated acid, in which free or uncombined iron oxide is also soluble.

By these results, it is clear that combination begins about 1000 deg. C. and proceeds very slowly up to 1150 deg. C., but comes to an end suddenly at 1200 deg. C. by melting.

(3) Monocalcium ferrite $CaO \cdot Fe_2O_3$ produced in F107 was dissolved, its solubility in hydrohcloric acid being smaller than that of the $2CaO \cdot Fe_2O_3$ in the first report, and the part dissolved in 0.5-2.0 normal hydrocloric acid was nearly pure $CaO \cdot Fe_2O_3$ as shown in Table IV.

(4) Separation of $2CaO \cdot Fe_2O_3$ and $CaO \cdot Fe_2O_3$ from the mixed products of two ferrites as F532 or F322 in the following Table V was carried out by treating the heated powder with 0.4 normal HCl to dissolve $2CaO \cdot Fe_2O_3$ and then with 0.8-2.0 normal acid to dissolve the residual $CaO \cdot Fe_2O_3$, as shown in Table VI.

By these experiments it is clear that two calcium ferrites $2CaO \cdot Fe_2O_3$ and $CaO \cdot Fe_2O_3$ can be separated by treating with HCl of different concentration, and the mechanism of formation of two ferrites in the order that the monocalcium ferrite $CaO \cdot Fe_2O_3$ is produced at first and then changes to the dicalcium-ferrite $2CaO \cdot Fe_2O_3$ for high lime mixtures.

The results of the studies on the hydration of (*a*) these two ferrites, (*b*) the heating test of three components Al_2O_3-Fe_2O_3-CaO or SiO_2-Fe_2O_3-CaO, (*c*) the heating test of four components SiO_2-Fe_2O_3-Al_2O_3-CaO, (*d*) the iron cement or the ore cement, etc., will be reported in future papers.—*Institute of Silicate Industry, Department of Applied Chemistry, Faculty of Engineering, Toyko Imperial University.*

Standardization of Weighing Devices for Aggregate

THE COMMITTEE REPORT to the American Road Builders' Association on the standardization of weighing devices for concrete aggregates is contained in a reprint of the 1930 proceedings, and is available along with a number of reprints on other related subjects, from the association, National Press Building, Washington, D. C.

California's Mineral Industries

COMPILATION of the final returns from the mineral producers of California for 1929 by the statistical section of the state division of mines, under the direction of Walter W. Bradley, state mineralogist, shows the total value of the year to have been $432,248,228, being an increase of $99,533,995 over the 1928 total of $332,714,233.

The distribution of the 1929 output of California by substances:

Substance	Amount	Value
Barytes	26,796 tons	$168,829
Bituminous rock	3,320 tons	14.360
Borates	144,678 tons	3,312,085
Brick and hollow building tile	....	5,607,410
Cement	12,794,729 bbl.	21,038.565
Chromite	327 tons	5,025
Clay (pottery)	839,949 tons	1,127,517
Coal	450 tons	2,476
Copper	33,809,258 lb.	5,941,799
Dolomite	58,644 tons	156,928
Feldspar	13,377 tons	78.404
Fuller's earth	14,541 tons	170.563
Gems	....	26.850
Gold	....	8,526.703
Granite	....	1,169.271
Gypsum	140,844 tons	396.951
Lead	1,428,777 lb.	90.014
Lime	42,834 tons	417.101
Limestone	162,315 tons	557.617
Magnesite	47,769 tons	488,014
Marble (onyx and travertine)	....	93.661
Mineral paint	467 tons	2.820
Mineral water	27,032,083 gal.	2,040.615
Natural gas	400,129,201 M. cu. ft.	29,607.546
Petroleum	292,534,221 bbl.	321,366.863
Platinum	212 fine oz.	14,416
Pumice and volcanic ash	10.449 tons	76.123
Pyrites	79,169 tons	363.717
Quicksilver	10,152 flasks	1,195,705
Salt	392,039 tons	2,665.436
Sandstone	177,655 cu. ft.	49.881
Silica	18,686 tons	79,210
Silver	1,176,895 fine oz.	627,285
Soapstone and talc	18,676 tons	193,493
Soda	90,646 tons	1,838,657
Stone, miscellaneous*	....	17,840,159
Tungsten	150 tons	106,480
Unapportioned†	....	5,329,679
Total value		$432,248,228

*Includes macadam, ballast, rubble, riprap, sand and gravel.

†Includes asbestos, bromine, calcium chloride, diatomaceous earth, magnesium salts, manganese, mica (sericite), potash, slate, sillimanite-andulasite-cyanite group, tube-mill pebbles, sulphur and tin.

Gypsum in 1930

THE FOLLOWING TABLE shows the result of a canvass by the United States Bureau of Mines, Department of Commerce, of the gypsum industry to show the quarterly production, imports, and sales of gypsum and gypsum products in the United States.

QUARTERLY PRODUCTION, IMPORTS AND SALES OF GYPSUM AND GYPSUM PRODUCTS IN THE UNITED STATES IN 1930, AS REPORTED BY OPERATORS

		First quarter	Second quarter
Number of operators reporting		26	26
Crude gypsum mined	Short tons	697,441	962,978
Crude gypsum imported	Short tons	(*)	253,960
Crude gypsum sold (domestic and imported)	Short tons	169,076	285,063
Calcined gypsum produced from domestic and imported rock	Short tons	571,973	682,117
Calcined gypsum products sold from domestic and imported rock:			
For pottery, terra cotta, plate glass, mixing paints, etc.	Short tons	54,287	49,952
Keene's cement	Short tons	10,404	10,441
Neat, wood fiber, sanded, gaging, finish plasters, etc.	Short tons	374,557	468,139
Wall board	Square feet	113,751,111	140,911,403
Plaster board	Square feet	57,140,843	68,294,655
Partition tile	Square feet	7,255,524	6,883,527
Roof tile	Square feet	686,142	1,074,242
Other tile	Square feet	(*)	(*)
Other calcined gypsum sold	Short tons	3,664	3,415

*Less than 3 operators reporting.

Gypsum Plaster Sands of the Pacific Coast

By Wallace C. Riddell
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STANDARD SPECIFICATIONS for gypsum plaster sands have been proposed by the American Society for Testing Materials as follows:

(*a*) Sand used for plastering purposes in which gypsum plaster is employed shall be free from salt and from alkaline, organic and other deleterious substances.

(*b*) It shall be graded from fine to coarse and when dry not more than 10% by weight shall be retained on a No. 8 sieve; not less than 80% by weight shall be retained on a No. 50 sieve, and not more than 6% by weight shall pass a No. 100 sieve.

While these specifications are not in general use on the Pacific Coast, they indicate what is necessary for an ideal plastering sand. In general, good results can be obtained by the use of sands approximating these specifications. Occasionally sands are encountered which closely comply with these specifications but which do not give entirely satisfactory results.

Physical tests have been made of a number of plaster sands in general use on the Pacific Coast. These tests indicate the quality of the sands available and should be of interest in formulating specifications.

In making tensile strength and setting time tests, the mixture used was one part of fibered hardwall plaster to three parts of sand by weight. This is equivalent to approximately a 100-lb. sack of plaster to 18 No. 2 square-point shovels of sand. The average weight of one No. 2 square-point shovel of sand equals 17 lb. This is the average weight as used on the job and represents tests made of 21 sands in general use from Seattle to San Diego.

This proportion of plaster to sand is the average in general use on the Pacific Coast.

Analysis of gypsum fibered hardwall plaster used for tests:

	Per cent.
Insoluble (silica and silicates)	1.05
Iron and aluminum oxides, Fe_2O_3 + Al_2O_3	0.20
Calcium carbonate, $CaCC_3$	0.76
Calcium sulphate, $CaSO_4$	91.90
Combined water, H_2O	5.95
Total	99.86

Calcined gypsum content, $CaSO_4 \cdot \frac{1}{2}H_2O$	= 96.5%
Fineness	
Per cent. passing No. 100 sieve	= 96.0
Per cent. passing No. 200 sieve	= 84.0
Pounds of retarder per ton	= 7.25
Pounds of fiber per ton	= 4.50
Water required for normal consistency—neat	= 75%

PHYSICAL TESTS OF PACIFIC COAST PLASTER SANDS

Origin of sand	Seattle, Wash. Queen Ann	Tacoma, Wash.	Portland, Ore.	Marysville, Calif. Yuba River	Sacramento, Calif. Amer. R.	Sacramento, Calif.	Merced, Calif.	Fresno, Calif.	Bakersfield. Calif.
Normal consistency									
Water required for 1:3 mix, %	23.8	24.0	25.0	25.0	27.0	25.0	24.2	24.0	24.2
Setting time, 1:3 mix, hr.: min	3:00	4:00	7:00	12:00	6:15	9:00	7:30	6:30	10:00
Tensile strength, lb. per sq. in., 1:3 mix	95	100	110	120	100	115	150	140	125
	90	90	115	120	110	115	130	145	115
	90	95	120	130	105	110	145	140	120
Loose dry weight sand, lb. per cu. ft.	71	71	69	71	69	68	71	71	70
Screen analysis									
Residue on No. 10 sieve	5.0	0.5	1.0	0.5	0.5	1.0	0.0	4.0	5.0
Residue on No. 20 sieve	10.0	8.5	18.3	15.5	7.0	6.5	23.0	16.5	8.5
Residue on No. 40 sieve	29.5	45.0	41.0	55.0	30.0	42.5	44.0	48.0	25.0
Residue on No. 60 sieve	32.0	32.0	21.0	24.5	36.0	35.0	17.5	22.5	27.0
Residue on No. 80 sieve	14.0	11.0	13.0	3.5	23.0	9.5	8.0	6.5	22.5
Residue on No. 100 sieve	3.0	1.0	1.5	0.5	1.5	1.5	1.5	0.5	4.0
Passing No. 100 sieve	7.0	2.0	4.0	0.5	2.0	4.0	5.5	2.0	8.0
Total, %	100.5	100.0	99.8	100.0	100.0	100.0	99.5	100.0	100.0

	San Francisco, Calif.					Los Angeles, Calif.			
Origin of sand	Bank	River	Monterey, 20-40	Monterey, Bank run	Olympia	Alhambra	C.B.M.Co.	A.M.M.	Tucson. Ariz.
Normal consistency									
Water required for 1:3 mix, %	25.0	24.0	20.8	22.5	23.0	22.0	22.0	22.5	23.0
Setting time, 1:3 mix, hr.: min	5:00	6:00	16:00	9:00	10:00	16:00	12:00	5:00	6:00
Tensile strength, lb. per sq. in., 1:3 mix	90	110	175	130	140	135	150	125	130
	85	120	165	135	140	140	150	135	135
	90	110	165	140	140	140	155	130	130
Loose dry weight sand, lb. per cu. ft.	74	71	78	79	72	71	72	71	71
Screen analysis									
Residue on No. 10 sieve	0.0	1.0	8.0	3.0	5.0	13.0	10.0	13.5	9.0
Residue on No. 20 sieve	0.0	7.0	56.0	25.0	21.5	26.0	31.5	22.0	29.5
Residue on No. 40 sieve	2.0	41.0	34.5	38.5	49.0	27.5	34.0	28.0	24.5
Residue on No. 60 sieve	28.5	28.5	1.0	26.5	19.0	20.5	19.5	15.0	13.0
Residue on No. 80 sieve	47.5	14.0	0.0	6.0	4.0	4.0	1.5	9.0	9.0
Residue on No. 100 sieve	10.0	2.0	0.0	0.5	0.5	4.0	1.5	1.0	4.0
Passing No. 100 sieve	12.0	6.0	0.0	0.5	0.5	4.5	1.5	11.0	10.5
Total, %	100.0	99.5	99.5	100.0	99.5	99.5	99.5	99.5	99.5

An actual-sized photograph of sample piece of new fireproofing insulation board

A Fireproofing Insulating Building Material From Rock and Wood

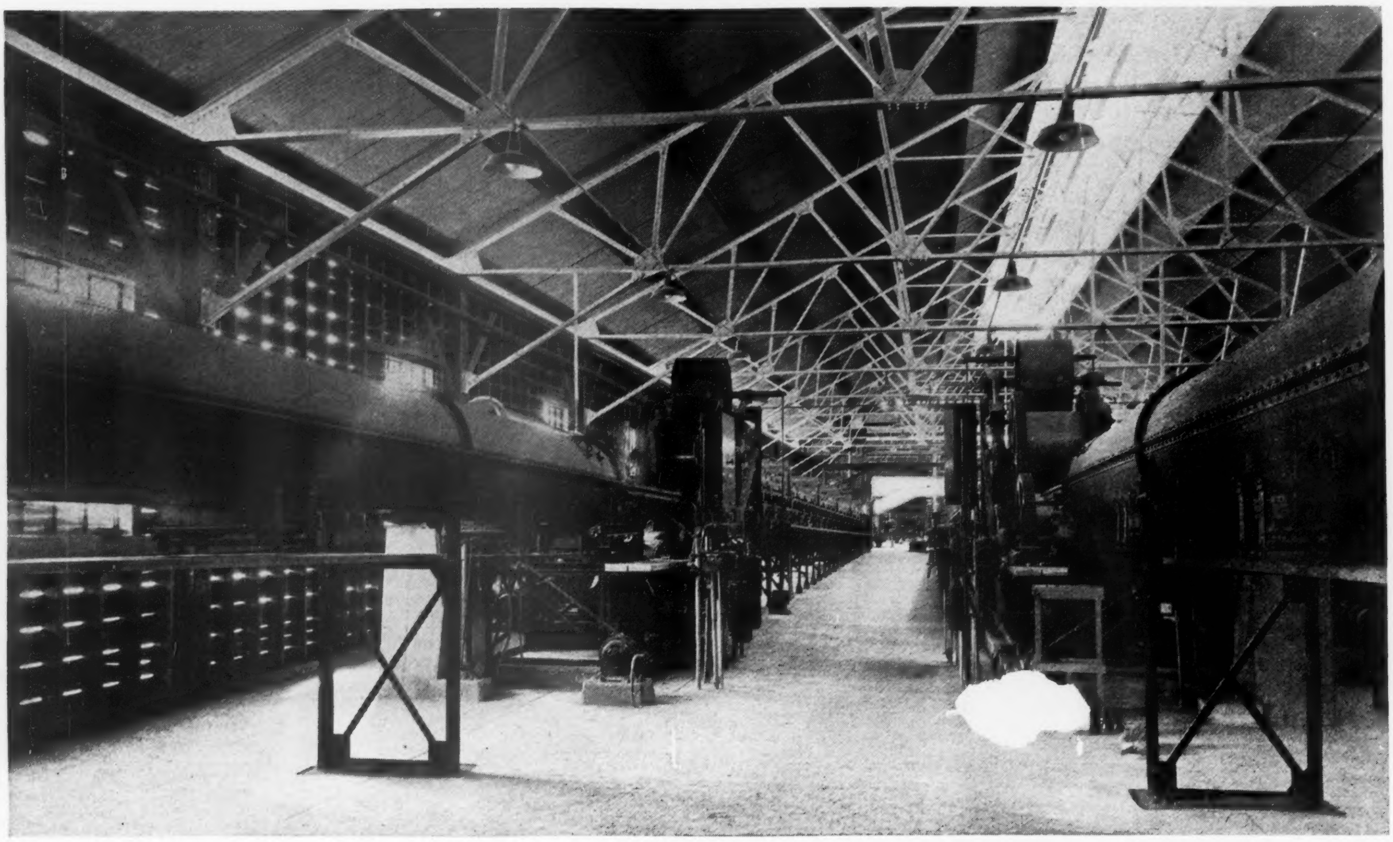
By R. E. Bennett
Thermax Corporation, Seattle, Wash.

FOR the first time in America there is being produced a truly fireproofing insulation board with calcined magnesia as a bonding agent. This material is now being introduced to the construction industry by the Thermax Corporation. It has been manufactured and used successfully throughout continental Europe for the past 12 years, with a consumption of over 50,000,000 sq. ft. in 1929, where it has been known as "stone wood" or "rock wood."

"Thermax" is the name of the product —it is a building material, in board or slab form, that is virtually a "fireproofing, insulating lumber" but embodying many other desirable qualities, namely, light weight, structurally strong, vermin-proof, sound-deadening, has acoustic value, is non-absorbent, odorless and permanent. It is an ideal building board, lath, plaster or stucco base, partition block or roof slab, manufactured in three thicknesses, 1-in., 2-in., 3-in., all 20-in. wide and 48 or 64 in. long, and in units that are easily handled, nailed or laid.

One of many uses for the new board

Its uses in various types of buildings are innumerable — apartments and hotels, homes, industrial and manufacturing structures, cold storage plants, churches and theaters, semi - permanent exhibition buildings, resorts, poultry and brooder houses — in fact, buildings of all types



Two of the four complete units installed for manufacturing new insulation board in a continuous operation

can use Thermax advantageously in numerous ways.

This fireproofing building material is produced in one continuous mechanical operation that shreds waste lumber into long, tough fibers, passes the fibers through a binding emulsion of high temperature cement, rolls, forms, dries and cuts the product into size.

Plant in Washington State

The first large and modern unit for producing this material in the United States has been built at Chewelah, Wash. (near Spokane), with an annual capacity of 30,000,000 ft. Here the raw materials, rock and wood, are assembled efficiently and economically. This plant is now in full production and shipments are being made. The distribution of Thermax will be through the lumber and building material merchants of the country. Chewelah, it will be recalled, is the home of the Northwest Magnesite Co.

The Thermax sales program is under the direction of the author, with general sales offices in the Fourth Avenue building, Seattle, Wash. The author is well known in the building industry, having for a number of years been active and successful in sales direction and merchandising for leading manufacturers of nationally known building products and insulating materials.

Announcements and samples of this interesting product have already been sent to the trade; authentic test data, construction details, and literature of attractive nature for properly presenting the many merits of Thermax to the architects, engineers, builders and consumers of the United States are available.

Referring to the accompanying pictures, the airplane view shows the plant as a whole. Magnesite rock is brought in from the mines and quarries five miles distant by an overhead tramway system. It is burned, ground and mixed into a high temperature cement emulsion which is the bonding agent for the long, coarse wood fibers that go to make up the Thermax slabs.

R. E. Bennett

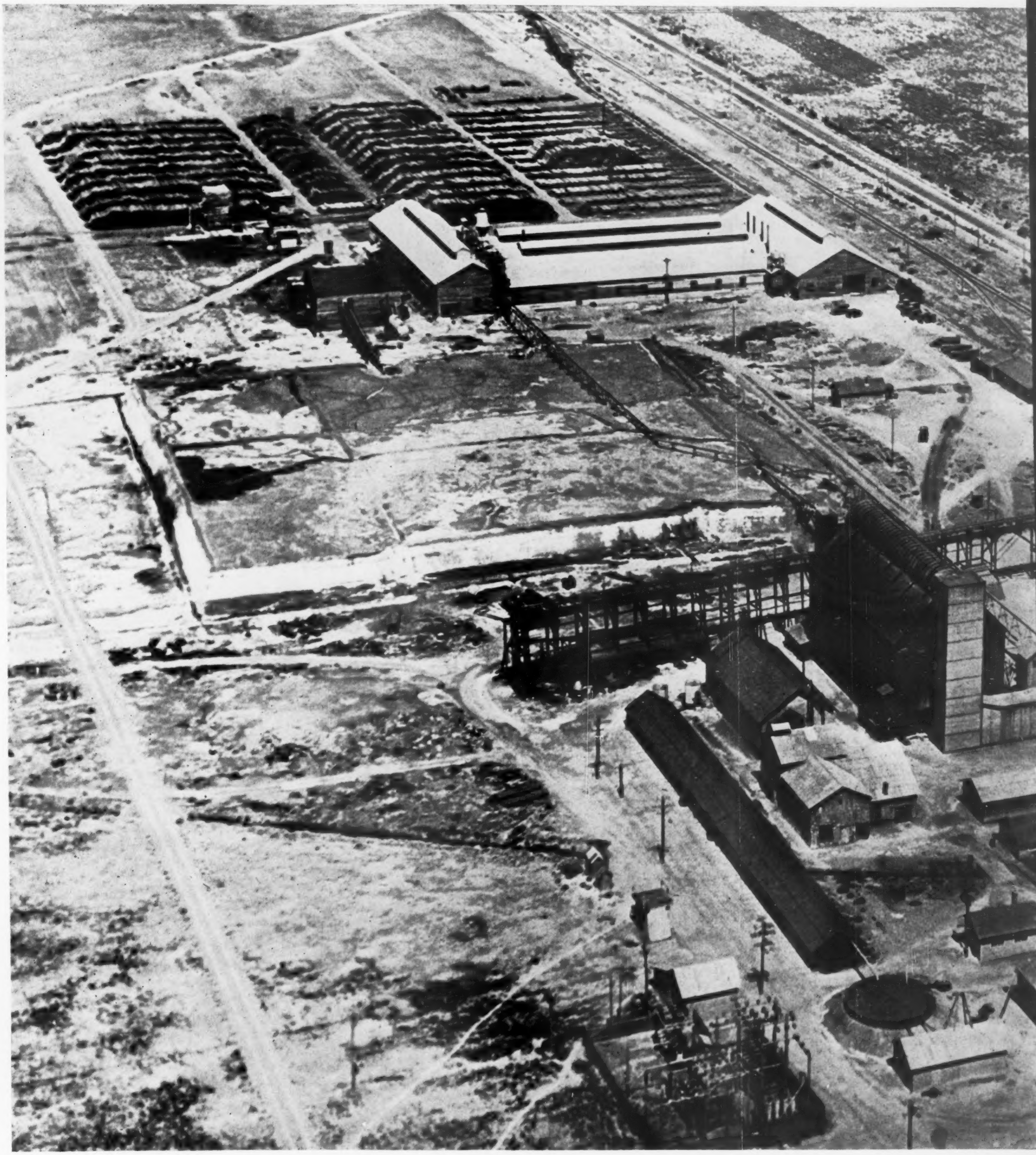
The interior view of the plant shows two of the four complete units which manufacture Thermax in one continuous mechanical operation. Two of these machines are set to manufacture 1-in. board, one 2-in. board and one 3-in. board. All, however, can be adjusted to manufacture any thickness desired.

The picture showing a construction use for Thermax typifies one of its many uses. In this particular picture the standard 2-in. material, measuring 20 in. wide by 64 in. long, has been nailed to wood studding, breaking vertical joints, and ordinary portland cement stucco is being applied directly to the Thermax. It has been proven over a period of years that Thermax for this type of construction is absolutely satisfactory.

The writer was for several years connected with the American Cement and Plaster Co., both in a sales and engineering capacity. This company was absorbed by the Beaver Board Cos., the writer having charge of the eastern sales for the gypsum division; later, in charge of eastern sales for the Beaver Products Cos., and later with the United States Gypsum Co., insulating division.

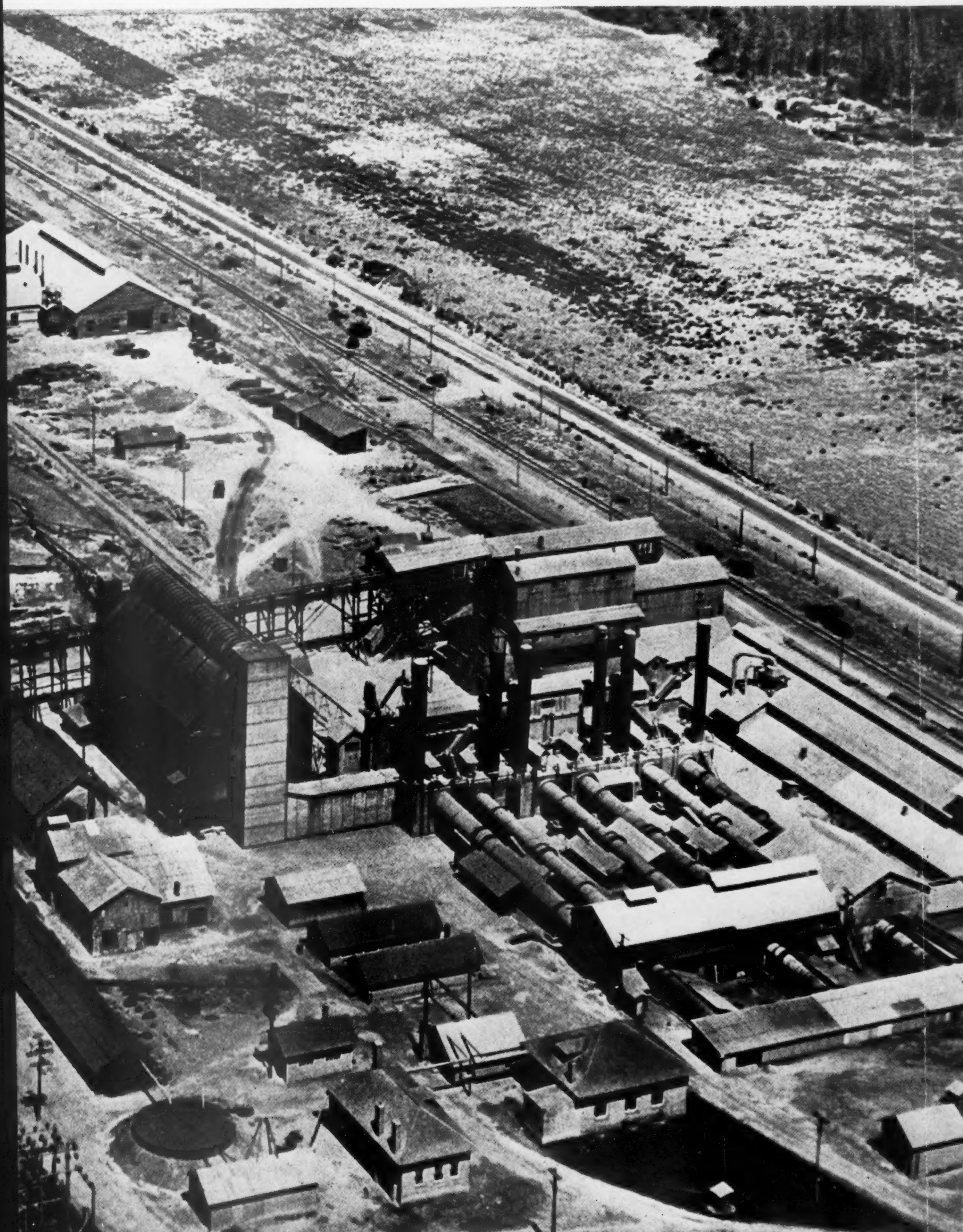
The Bureau of Standards, Washington, D. C., has recently completed fire tests on Thermax, passing it for a two-hour rating, comparable with hollow gypsum blocks and clay tile.

Supplement to Rock Products, Volume X

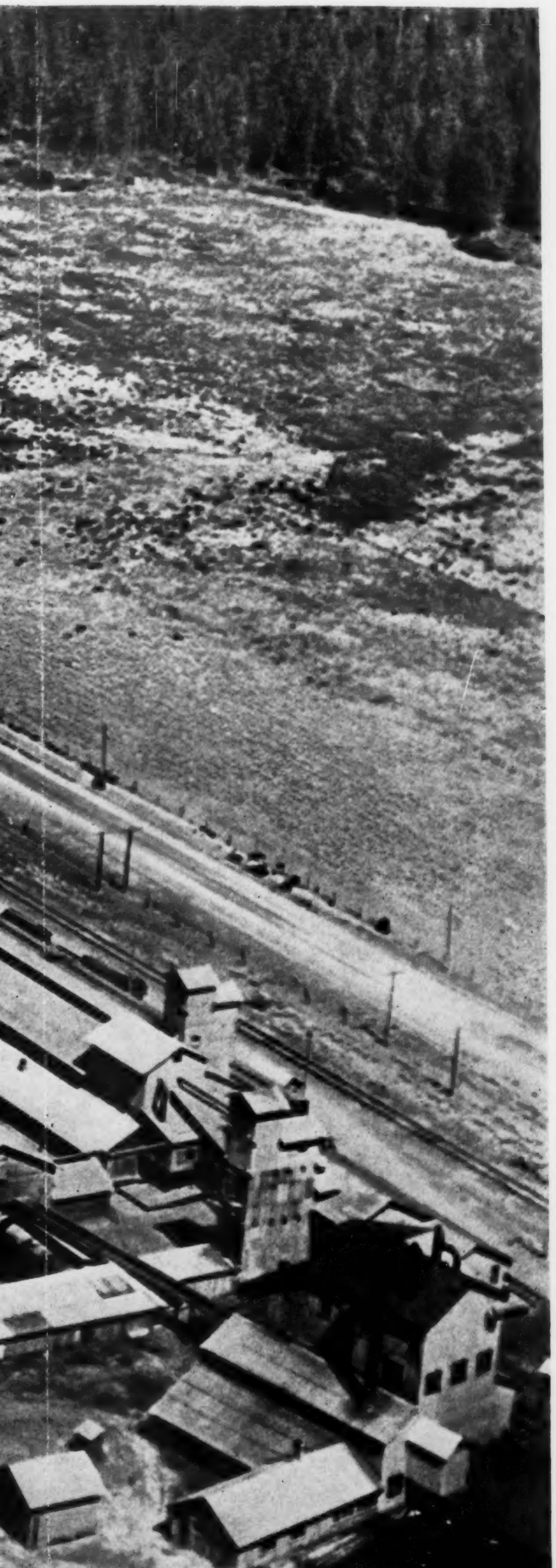


Airplane photograph of the Thermax Corp. and the Northwest Magnesite Co. plants at Chewelah, Wash., near Spokane, the first manuf

ıcts, Volume XXXIII, No. 22, October 25,



velah, Wash., near Spokane, the first manufacturing unit of new industry which will produce insulation board using calcinea



ng calcined magnesia as a bonding agent

Reply to Duff A. Abrams' Comments on "High-Early-Strength Concrete"*

By S. Rordam

I QUITE AGREE with Professor Abrams† that in several cases a job may call for concrete which should develop a high strength in one or two days. I also believe that ordinary portland cement often will be at a disadvantage in such cases, especially when it is a question of "24-hour concrete." But I cannot agree that concrete which develops a high strength at 3 days is not within the limits of what generally is understood by high-early-strength concrete.

Professor Abrams points out that I have chosen a portland cement which exceeds the (old) requirements for tensile strength by 53% at 7 days and 32% at 28 days, whereas the quick hardening cement does not show the same superiority in relation to the standards for high-early-strength portland cement. But is it not a fact that nearly all brands of ordinary portland cement are considerably ahead of the requirements for tensile strength?

My paper on high-early-strength concrete was based on a series of tests I have made in order to establish the relation between the water-cement ratio and the compressive strengths of a number of commercial quick-hardening cements and ordinary portland cements. The tests so far have comprised three brands of quick-hardening cement and about a dozen brands of ordinary cement. The various samples were obtained either directly from the mills or were purchased in the open market from freshly received stock.

The aggregates used were Tennessee River sand and gravel. The sand had a fineness modulus of about 2.7, and the gravel was graded ¼ in. to 1¼ in. The aggregates were used in room-dry condition. The absorption was as follows: Sand, 0.90% by weight, gravel, 1.11% by weight.

In adding water to the concrete mixes due allowance was made for the water absorbed. In the range of the mixes used this amounted to about 10% of the total water.

With each brand of cement a series of mixes was prepared covering the water-cement ratios from about 4 to 8 gal. of water per bag of cement, and the compressive strengths of the various mixes were tested at 1, 2, 3, 7, 28, 90 days and 1 year. This gave a complete series of curves from which could be determined the exact water-cement ratios which would give the desired strengths at the given age (say 3 days).

*Published in ROCK PRODUCTS, August 30, 1930, pp. 45-46.
†Published in ROCK PRODUCTS, October 11, 1930, p. 68.

The data for water-cement ratios and cement content of the mixes represented by the diagram in my previous article are given in Table I.

TABLE I—WATER-CEMENT RATIOS FOR GIVEN REQUIRED CONCRETE STRENGTHS

	Portland Cement		Quick-Hardening cement	
3-day strength	Gal. bag	Bbl. per cu. yd.	Gal. bag	Bbl. per cu. yd.
3000 lb.	4.25	2.33	6.5	1.40
2500 lb.	4.75	2.00	7.0	1.25
2000 lb.	5.5	1.73	7.9	1.15
1500 lb.	6.4	1.49	9.0	1.00

Professor Abrams contends that I do not do justice to the quick-hardening cements. To this I can only say, that within the scope of the subject dealt with in my paper I have given *every* advantage to the quick-hardening cement. From the various brands of cement I picked the quick-hardening cement which developed the best concrete strength, and I chose a portland cement which was rather slow in getting its full strength. The tests in Table II will illustrate this.

TABLE II—COMPARISON OF HIGH EARLY STRENGTH CEMENT AND PORTLAND CEMENT

	H.-E. Cem. No. 1	H.-E. Cem. No. 2	Ord. P. C.
Tensile strength, 1:3 1 day	275	333	126
2 days	368	344	....
3 days	375	397	243
7 days	451	410	344
28 days	523	440	430
Concrete tests: (6-in. x 12-in. cyl.)			
Mix, dry rodded volumes	1:2:3	1:2:3	1:1.9:2.85
Gallons of water per bag:			
For cement	6.00	6.00	6.00
For absorption	0.62	0.62	0.59
Cement, bbl., per cu. yd.	1.55	1.55	1.61
Compressive strength: 1 day	1449	1831	450
2 days	2863	2517	1097
3 days	3315	2823	1678
7 days	4260	3197	2872
28 days	5340	3790	4259

H.-E. Cement No. 1 is the one used for the discussion in my paper. The above figures also explain why the tensile strength of the quick-hardening cement I used is not particularly high. It so happened that the cement with the highest early tensile strength was not the cement with the best concrete strength.

As regards the question of the proportioning of the concrete mixes represented by my diagram, see the figures given in Table III.

The other mixes were proportioned along similar lines, with water-cement ratios and cement factors as given in Table I. All mixes were designed to give as nearly as possible the same workability with maximum yield.

My paper on "High-Early-Strength Concrete" was not written with the object in view of decrying the use of quick-hardening cements. Both quick-hardening cement and ordinary portland cement have their distinct fields of economic use. In my paper I investigated that part of the field where the two types of cements at present meet on more or less competitive terms. My conclusions were, in the words of Professor Abrams: "If 3-day strengths were aimed at, there would be little inducement to use high-early-strength cement."

TABLE III — PROPORTIONING OF CONCRETE HAVING A STRENGTH OF 2500 LB. IN 3 DAYS. MATERIALS FOR 1 CU. YD. CONCRETE

	Portland cement	Quick-hardening cement
Cement	2.0 bbl.	1.25 bbl.
Dry Sand	1090 lb.	1250 lb.
Dry Gravel	1890 lb.	1970 lb.
	gal. bag	gal. bag
Water for cement	4.75	7.00
Water for absorpt.	0.46	.79
Compressive Strength:		
1 day	800 lb.	1000 lb.
2 days	1750 lb.	2000 lb.
3 days	2500 lb.	2500 lb.
7 days	3850 lb.	3400 lb.
28 days	5350 lb.	4350 lb.
90 days	6250 lb.	4450 lb.

Birmingham Slag Co. Plant Damaged by Fire

THE BIRMINGHAM SLAG CO., Birmingham, Ala., owned and operated by C. L. Ireland of Van Wert, Ohio, and his two sons, Eugene and Byron Ireland of Birmingham, Ala., suffered a heavy fire loss when the screening plant No. 1, located at Ensley, Ala., was destroyed, October 14.

The loss is estimated at $100,000 which is fully covered by insurance. The crushing plant and power plant were saved from the flames. The plant destroyed is the largest one operated by the company and has a capacity of a hundred cars a day. Mr. Ireland estimates that it will require four months to rebuild the destroyed structure.—*Lima* (Ohio) *News*.

A Modification of Iron Oxide Analysis Using Diphenylamine Indicator

By Wallace K. Gibson
Chemist, Trinity Portland Cement Co., Dallas, Tex.

IN ROCK PRODUCTS, September 14, 1929, Robert R. King contributed an article on the analysis of iron oxide (Fe_2O_3) using a "titrating solution." The titrating solution consisted of 150 cc. of sulphuric acid, 150 cc. of phosphoric acid diluted to a liter with water as is described in W. W. Scott's Analytical Chemistry.*

Chemists using the potassium ferricyanide outside indicator method may have found that the inside indicator method requires more potassium dichromate solution to titrate an iron solution than by the outside indicator method. The writer's investigation of reasons why such actually is the case revealed that King-Knop's titrating solution does not contain enough sulphuric acid to render the diphenylamine indicator uniformly effective in its color end-point in presence of hydrochloric acid. Diphenylamine is insoluble in any concentration of hydrochloric acid. The titrating solution contains too much phosphoric acid for effective titration. When the titrating solution is poured into a solution having the violet-blue end-point of the diphenylamine indicator, the blue end-point fades out. This proves that an excess of phosphoric acid in titrating solution affects accuracy in the iron oxide analysis.

A modified titrating solution that works more effectively and reliably is made up in the following manner: Pour 100 cc. of concentrated sulphuric acid in 100 cc. of phosphoric acid (71%). Dilute to 666 cc. with distilled water. Add 334 cc. concentrated sulphuric acid to make up a liter.

A factor obtained by standardizing a dichromate solution by the potassium ferricyanide outside indicator cannot be applied when a sample is titrated according to the inside indicator method. The standard solution should carry a factor obtained by the inside indicator when the outside indicator method is followed. Standardizing a potassium dichromate solution by the potassium ferricyanide outside indicator method using standard iron wire showed the solution's strength to be 0.00511 gm. Fe_2O_3 per cc. The modified inside indicator method standardized the solution as 0.0050 gm. Fe_2O_3 per cc. Using King's and Knop's methods, the same solution was standardized as 0.004955 and 0.004945, respectively.

*Quoting J. Knop in the *Am. Jour. of Chem. Soc.*, Vol. 46, page 263, February, 1924.

Editor's Note

ALL the articles in the Chemists' Corner of this issue are discussions of previous articles in this special department. The editor especially welcomes such discussion, and again reminds the readers that this department is designed especially for just such an exchange of experience, views and opinions. These contributions are all paid for as published—and the authors of the best three contributions, whether of articles or letters discussing articles, will be rewarded at the end of the calendar year with cash prizes of $100, $50 and $25.

This department of ROCK PRODUCTS is for the chemists of cement, lime, gypsum or other rock products plants and will be expanded if necessary to give as complete a forum for their discussions as may be necessary. So with the slack season in operation approaching the editor hopes he shall not want for contributions.

Calculations revealed that the modified method checks more closely with the outside ferricyanide method than the King-Knop's method when a sample is dissolved by hydrochloric acid.

Cement—Sample A

$0.00511 \times 3.50 \text{ cc.} \times 2 = 3.58\%$*
$0.00500 \times 3.60 \text{ cc.} \times 2 = 3.60\%$†

Cement—Sample B

$0.00500 \times 3.65 \text{ cc.} \times 2 = 3.65\%$†
$0.00511 \times 3.55 \text{ cc.} \times 2 = 3.63\%$*
$0.004955 \times 3.80 \text{ cc.} \times 2 = 3.77\%$‡
$0.004945 \times 3.75 \text{ cc.} \times 2 = 3.70\%$§

In standardizing the same dichromate solution aforementioned, by dissolving a standard iron wire in sulphuric acid, Knop-King's method and the modified method checked each other exactly, viz.: 0.0050—0.0050.

A sample whose percentage of iron oxide was 3.55 by the modified method was checked by fusing R_2O_3 in sodium acid sulphate ($NaHSO_4$) and dissolving in dilute hydrochloric acid, using King-Knop's titrating solution, adding only three drops of the indicator. The result came out checking the modified method exactly—3.55.

Evidently the sulphate radical from sodium acid sulphate has assisted the proper operation of the titrating process using King-Knop's titrating solution. Therefore, titrating a potassium dichromate standard solution into a hydrochloric acid solution does not work consistently when too much of phosphoric acid and insufficient sulphuric acid are being used to get the end-point of the diphenylamine indicator. An unnecessary excess of phosphoric acid acts upon the dichromate solution. Diphenylamine is easily soluble in sulphuric acid, therefore a solution to be titrated should contain sufficient sulphuric acid to render the diphenylamine more easily reactive in a bulk of the solution containing hydrochloric acid.

Chemists who do not have confidence in the diphenylamine indicator method should find the modified "titrating solution" more adaptable to their use.

*Outside ferricyanide method.
†Inside diphenylamine indicator method using modified titrating solution.
‡King's method using 5-6 drops of diphenylamine indicator.
§Knop's method using 3 drops of diphenylamine indicator.

Barytes in California

KNOWN DEPOSITS of barytes in California are located in Inyo, Los Angeles, Mariposa, Monterey, Nevada, San Bernardino, Shasta, and Santa Barbara counties.

Analysis of the Article by Katsuzo Koyanagi on "Accounting for Ignition Loss in Analysis of Clinker"

By Alton J. Blank
General Superintendent and Supervising Chemist
Compania de Cemento Portland "Landa", S. A.
Puebla, Puebla, Mexico

IN AN ARTICLE, "Iron Oxide vs. Alumina as a Fluxing Agent in the Manufacture of Portland Cement," as appeared in "The Chemists' Corner" of the May 10, 1930, issue of ROCK PRODUCTS, Katsuzo Koyanagi gives certain data, the conclusions of which are questionable in that certain details of importance, having a direct bearing on results obtained, are not fully explained.

In the writer's analysis of this article as appearing in "The Chemists' Corner" of the June 7, 1930, issue of ROCK PRODUCTS, (1) attention was called to the gradual increase in the ignition loss of the cements under study, since the original cement contained an ignition loss of only 0.83% as against ignition losses of 0.91%, 0.94%, 1.13% and 1.28% in cements Nos. 2, 3, 4 and 5, respectively. It was assumed that, ordinarily this increase in ignition loss of cements could be traced to underburning of the cements, or careless storage of same before testing; (2) in perusal of the chemical analyses of the cements and of the formulas used in certain of the calculations made, the writer found the formula CaO/SiO_2—R_2O_3 which he naturally assumed was intended as being the formula CaO/SiO_2 plus R_2O_3, it seeming plausible that the minus sign appearing between the SiO_2 and the R_2O_3 was a misprint since the plus sign appeared in other of the formulas contained in the article; in applying this formula to each of the cements as shown in Table 1, certain errors in the calculations were to be found, and since these errors could have a direct bearing upon the results obtained, this was pointed out as being of importance; (3) in perusal of the chemical composition of the pyrite cinder used as the admixture to the ordinary raw cement mixtures, there was found reported 1.56% of sulphur (S), and since all pyrite cinders as have come under the writer's observation have had a part of their sulphur present as sulphide, it was suggested that such might be the case with the cinder in question, and that an explanation of this sulphur content might have been included in the article.

In the article, "Accounting for Ignition Loss in Analyses of Clinker," in "The Chemists' Corner" of the August 16, 1930, issue of ROCK PRODUCTS, Mr. Koyanagi takes it upon himself to explain certain of the details that had not received due consideration in the compilation of his initial article.

(1). The increased ignition loss found in his experimental cements is accounted for in the moisture absorbed by the clinker from the atmosphere during its storage in the clinker building, since the atmospheric moisture ranged between 40 and 60% at the time his experiments were begun, and ranged between 80 and 100% during the rainy season at the time of their conclusion.

It is further explained that clinker is always burned very hard since it is considered a disgrace by the burners to underburn the clinker. Clinkers Nos. 4 and 5 of the experiment are described as having been burnt so hard that, before grinding, it was necessary to give the clinker a preliminary crushing in order that the required fineness of the cement be obtained.

Mr. Koyanagi further advises that his experience has not shown an increase of 0.45% in the ignition loss of a cement to seriously affect its strength, and to better illustrate his experience in this connection, reports the following experiment: Three samples of fresh cement, a part of each of which has been set aside in hemp bags in the laboratory for a period of two months, are tested for tensile and compressive strength, and the ignition loss on each determined. At the end of two months the stored samples of cement are likewise tested as above. Perusal of the results shown in Table 1 shows the ignition losses of the cements to be 0.82%, 1.05% and 0.67% higher for the stored samples of cements Nos. 1, 2 and 3, respectively, while tensile and compressive strengths, as a whole, are higher for the stored samples.

(2). The reference to the errors in the lime ratios of the cements is pointed out by Mr. Koyanagi as being, in one case, due to a misprint from the original paper, and it is further brought out that the calculations were made from the hydraulic modulus formula: Total lime minus lime in gypsum added/SiO_2 plus R_2O_3.

(3). Mr. Koyanagi explains the sulphur content of his pyrite cinder as being present as sulphide and sulphate, the sulphuric acid anhydride content of the cinder being 0.95%, the sulphur sulphide content being 1.18%. It is also doubted that the small presence of these sulphur compounds could seriously affect the strength and soundness of the cement. The information is also advanced to the end that frequent analyses of the waste kiln gases at his plant show a reducing atmosphere to be had but rarely in the kilns, and in support of this statement, five typical waste kiln gas analyses are shown in Table 2 of the article.

In concluding Mr. Koyanagi expresses a desire to learn more of the effect of sulphur upon portland cement manufacture and quality.

The writer's discussion of this second article by Mr. Koyanagi is as follows:

(1). If, as stated, all clinker produced in the experiments was well burned, it still remains difficult to understand the difference in the ignition losses which is shown to increase from one experimental clinker to the other, unless, however, there was a difference in the degree of hardness to which successive experimental clinkers were burnt. If all clinkers were burnt to the same degree of hardness, their affinity for the absorption of moisture from the atmosphere during storage, should be the same. In the case of clinkers Nos. 4 and 5, which were burnt so hard that preliminary crushing was necessary in order that they be reduced to the proper finenes in the mill, it is not easily understood why their affinity for moisture absorption should be greater than the preceding clinkers, since it seems entirely unlikely that the harder a clinker is burned, the greater will be its affinity for the absorption of atmospheric moisture. To the contrary the writer finds that where soft burned clinker may have its ignition loss increased by several per cent. when subjected to prolonged storage, extremely hard burned clinker stored under similar conditions will have its ignition loss increased not at all. Further, in the writer's own iron oxide experiments it was found that as the iron oxide content of the raw mixtures increased, resulting in better combination and consequently, better burned clinker, other things being equal, the ignition loss of the clinker decreased, and clinker of this nature stored in the open over a period of several weeks gave no noticeable increase in ignition loss over that obtained on the freshly burned clinker.

The writer has yet to find a portland cement whose strength qualities are bettered upon prolonged storage, whether under humid or dry atmospheric conditions, once ignition losses are increased due to absorption of moisture or carbon dioxide from the atmosphere.

Tests made of recent months in this connection with four samples of freshly ground cement, the average ignition loss of which was 0.88%, upon being stored in cloth bags for a period of three weeks were found to yield an average ignition loss of 1.34%, which amounted to an average increase of ignition loss, due to absorption of atmospheric moisture and carbon dioxide, of 0.46%. The average tensile strength of the four samples of fresh cement at all ages of test was found to be 18% higher than those average results obtained upon the stored samples, while the compressive strength

average of the four samples of fresh cement at all ages of test was found to be 13% higher than those average results obtained on the same stored samples of cement which had ignition losses increased to the extent of 0.46%.

Similar tests made by the writer over a period of years with a great number of cements of varied chemical composition have never resulted in the finding that prolonged storage with consequent increase in ignition loss due to absorption of atmospheric moisture and carbon dioxide, tends to increase the strength qualities of a cement, though it has been found that certain cements retrogress more slowly than others.

(2). In the original article by Mr. Koyanagi, errors were reported by the writer in the calculations of the lime ratios of the cements as made by the formula shown: CaO/SiO_2 plus R_2O_3.

In the second article by Mr. Koyanagi it is explained that the figures shown were in reality derived from the calculations made with the hydraulic modulus formula—Total lime minus lime in gypsum added/ SiO_2 plus R_2O_3. Since these formulas are somewhat different, it is to be hoped that this too was not a misprint from the original paper.

(3). Inasmuch as the writer has a paper in preparation which deals with the effect of sulphur containing fuels and raw mixtures upon portland cement manufacture and quality, this question will not be gone into at this time. However, on the appearance of this paper in the trade journal, and upon perusal of same, the writer shall be pleased to have Mr. Koyanagi's comments.

Again referring to the second article by Mr. Koyanagi, the writer notes with interest the statement made to the effect "that atmospheric moisture ranged between 40 and 60% at the beginning of the iron oxide experiments and increased to between 80 and 100% during the rainy season at which time the experiments were concluded." This would appear that as Mr. Koyanagi increased the iron oxide content of his mixtures during his experiment, there was a gradual increase in moisture present in the atmosphere.

The writer wonders whether or not this increase in atmospheric moisture had any influence upon the kiln outputs and fuel consumptions received in the above mentioned experiments.

The writer's experience with kiln operations in a country where a dry and rainy season are had and where the moisture present in the atmosphere is much greater during the latter season, has been to the end that kiln outputs and fuel consumptions are affected.

For comparative purposes the writer would be pleased to learn the experience of Mr. Koyanagi in this respect, since a 50% increase in atmospheric moisture should result in some differences in kiln operations, however small.

Perchloric Acid Method of Analysis for Silica

By C. F. Pinkerton

Chief Chemist, Idaho Portland Cement Co., Inkom, Ida.

IN the Chemists' Corner of the July issue of Rock Products, Wallace K. Gibson gives a very interesting article on the perchloric acid method of determining the SiO_2 content of cement or cement raw materials. The following method of procedure will be found just as efficient and at the same time more economical.

For cement and clinker: Weigh 0.5-gram sample into a tall 100-cc. beaker, moisten with 1-2 cc. water, and then add 12 cc. 60% perchloric acid. Cover and with hot plate on full heat, heat until dense white fumes are evolved and a condensate forms at the top of the beaker. At this point the volume is about one-third of the original and the silica has coagulated into coarse grains. Cool and then dilute to approximately 65 cc., using hot water. Bring to a boil, stirring constantly, set aside and when settled, filter. Wash twice with hot water, pour 20 cc. 1:1 HC1 over the precipitate in the paper, and then wash free of chlorides. Ignite and weigh as SiO_2.

For raw materials: Fuse 0.5-gram sample in the usual way, using not more than 2.0 grams Na_2CO_3 for flux. Remove from flame as soon as the mass is thin and can be easily rolled up on the side of the crucible. Cool, remove from crucible into 250-cc. beaker and dissolve in smallest possible volume for perchloric acid. Do not use any water to effect solution. From this point treat as for cement or clinker.

Limestones of which the purity is known to be above 90% may be ignited and the sample treated as for cement or clinker.

The period of time of fuming a sample of cement for analysis requires from 7-8 minutes and of a raw mix of not over 5 minutes.

The use of 60% perchloric acid by the above methods is not explosive. I have made hundreds of analyses in this way and have yet to experience my first explosion. Recovery of R_2O_3 from the silica and of SiO_2 from the R_2O_3 is also very small, the recovered R_2O_3 being less than 0.20% and recovered SiO_2 less than 0.10%.

The economy of this method over that outlined by Mr. Gibson is apparent in chemicals, time and power.

Rates of Solution of Small Particles of Gypsum and Anhydrite

IN CONNECTION with a study of the utilization of anyhdrite for the retardation of portland cement, the Nonmetallic Minerals Experiment Station of the United States Bureau of Mines at Rutgers University, New Brunswick, N. J., has determined the rates of very finely divided gypsum and anhydrite. For particles of both of these materials above 35 microns in size (one micron = 1/25,000 of one inch) the specific dissolution factor (rate of solution per unit surface of material of a given particle size divided by the rate per unit surface for particles larger than 35 microns), is unity. For gypsum the specific dissolution factor increases with decreasing particle size until a maximum of 3.9 is reached at 15 microns, whereas for anhydrite a maximum of 17.8 is reached at 1.5 microns. Below 15 microns the specific dissolution factor for gypsum drops rapidly, reaching the extraordinarily low value of 0.08 for a 3-micron particle and of 0.03 for a 1-micron particle. This is to be contrasted with a value of 16 for a 1-micron particle of anhydrite. Thus very finely ground anhydrite tends to dissolve relatively rapidly, but very finely ground gypsum relatively slowly. The details of these experiments will be published soon.

Chemical Engineering Catalog

THE 1930 Edition of the Chemical Engineering Catalog is now available. This catalog is the official standard reference for engineers, managers and purchasing agents in those industries using chemical processes, and its compilation is supervised by a committee of the American Institute of Chemical Engineers, the American Chemical Society, and the American Section of the Society of Chemical Industry (Great Britain). It is a compilation of data on equipment, supplies, chemicals and materials used in these industries, with a separate section for equipment and supplies, and another section for chemicals and new materials, and with classified indexes for ready reference. Also included is a trade name index, and a technical and scientific books section listing some 2600 books. An effort has been made to confine the information on equipment and materials to exact data on sizes, capacities, construction details, uses, etc.

This 1168-page book should be of great value to all those interested in this subject. It is distributed to engineers, chemists, managers and superintendents in these industries, to government technical departments and libraries, and to the heads of chemical engineering departments of universities and colleges, and under certain conditions will be sent free to those who can qualify under any of the above classifications. It is published by the Chemical Catalog Co., 419 Fourth Ave., New York City.

Leaders in Science and Industry Dedicate Westinghouse Memorial

THE NATION'S LEADERS of industry, business and scientific research paid homage to the late George Westinghouse, founder of the many Westinghouse industries, in the dedication of a memorial to the industrial leader in Schenley Park, Pittsburgh, erected by the Westinghouse Memorial Association, composed of 54,251 members, mostly Westinghouse employes, who, with the assistance of appropriations made by the Westinghouse Electric and Manufacturing Co. and the Westinghouse Airbrake Co., financed the undertaking.

The dedicatory ceremony, which began at 2 o'clock, was presided over by E. M. Herr, vice-chairman of the board of directors, and the program included addresses by A. L. Humphrey, president of the Westinghouse Airbrake Co. and one of the leaders in the movement for providing the memorial; James Francis Burke, former congressman and now general counsel of the Republican national committee, and Bishop Alexander Mann of the Pittsburgh Episcopal diocese. Mayor Charles H. Kline made the speech of acceptance in behalf of the city of Pittsburgh.

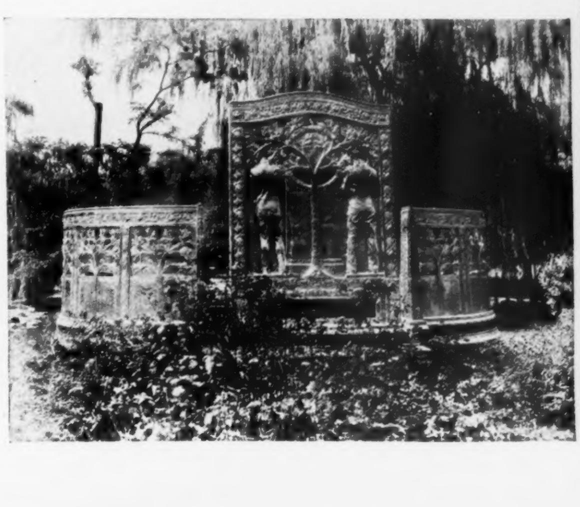
In the evening the guests attended a banquet in the William Penn hotel, where a program of music and speeches was presented, with Congressman James M. Beck of Philadelphia, former solicitor of the United States, and Right Honorable Lord Southborough, G.C.B., prominent industrialist of London, England, and John F. Miller, vice-chairman of the board of directors of the Westinghouse Airbrake Co., as speakers.

"In the presence of the prevailing pessimism that is spreading itself like a plague over the land, and in fact over the world, I know of no higher service that can be rendered by these distinguished sons of many nations whose names are watchwords in every department of commerce and industry, in every branch of science, than to revive and spread anew the all-conquering spirit of the man whose memory we honor today," said Mr. Burke. "Let us invoke his example in imparting courage to our contemporaries, rather than depressing them with dire predictions of disasters that will never happen.

"In spite of those who feed and fatten on imaginary woes, the world is not a wreck and man is not a failure. The refreshing waters of life have not run dry. The nation has not become a desolate waste. The bottom has not dropped out of existence.

"The real wealth of the world has not been diminished by a single farthing. Our genius to invent and our ability to build was never greater. The rise and fall of economic tides in the past have marked the story of the centuries with almost an unerring regularity. They end just as certainly as they begin. And with each succeeding ebb and flow of the economic tide our periods of prosperity are prolonged while those of depression are decreased.

"The doctrine of despair has no place in the gospel of American life. It never healed a wound. It never won a race. It never conquered an enemy. It never cultivated a farm. It never erected a factory. It never built a home."



A front and rear view of the Westinghouse memorial showing its beautiful setting in Schenley Park, Pittsburgh. The memorial is unique in that the backs as well as the fronts of the workmen and engineer flanking Mr. Westinghouse are shown

The central figure in the foreground is that of an American boy

Lehigh's Unusual System for Entertaining Visitors

SINCE PUBLICATION of our story concerning the inspection trip made by the Lehigh Valley Section of the American Institute of Electrical Engineers, of the Lehigh Portland Cement Co.'s Sandt's Eddy plant, R. B. Browne of the Lehigh advertising department, sends us some literature which indicates the comprehensive manner in which his company went about making the engineers' trip pleasant and profitable.

When the decision was made to visit Lehigh, each member of the Lehigh Valley A. I. E. E. received a personal letter containing a cordial invitation from the Lehigh company to be a member of the party, with which was enclosed a printed program for the day and a detailed itinerary outlining principal points of interest. In the laboratory every piece of equipment was labeled and a brief description and its use was printed opposite its number in the itinerary sheet, making the visitors' trip expeditious and instructive.

Arriving at the plant each member of the party received a letter of welcome conveying also pertinent statistics concerning the cement industry, its production and amount of material purchased. There were 375 engineers, wives and guests present. Each year the chapter makes an inspection trip of some important industry or project. Conowingo dam was inspected last year.

Calaveras Cement Co. Adds to Quarry Holdings

THE PURCHASE of a large limestone deposit at Jesus Maria in the Mokelumne Hill district, by the Calaveras Cement Co., San Andreas, Calif., was revealed recently, by a deed recorded at the request of the cement company. The land embraces the holdings of Gambetta Brothers and totals over 1030 acres. The deed was dated March 29, 1929, but was not made public until presented for recording.

With the acquisition of the Gambetta tract, the Calveras Cement Co. has practically acquired all the limestone belt through central Calaveras county. The latest purchase lies over 20 miles away from the plant at San Andreas, but is a continuation of their extensive holdings which run from their present quarry, up O'Neil creek, through Old Gulch and Mountain Ranch. It is understood that a survey has been made for a railroad into the extensive limestone holdings of the company. The recent purchase is reported to contain the best deposit of lime secured so far by the company. —*Stockton* (Calif.) *Record.*

Hints and Helps for Superintendents

Simple Switch Throwing Arrangement for Quarries

THE ACCOMPANYING PICTURE shows how one quarry operator worked out a switch throwing arrangement which saved the locomotive operator the trouble of getting out of his cab to throw the switch. In this case the locomotive used was one of the smaller gasoline type locomotives where the operator's position is quite low and where he can reach out and throw the short switch lever shown. The lever is of course a little farther than the length of the locomotive from the switch points, and in the case shown the other end of the crossover switch is also connected up to the crank and lever so that both sets of switch points are thrown together.

Switch throwing arrangement which saves locomotive operator's time

An Unusual Conveying Installation

AN INTERESTING SCHEME has been worked out at an English cement plant for conveying and disposing of material by blowing it out to a dump by means of a pipe and compressed air, as shown in the accompanying sketch.

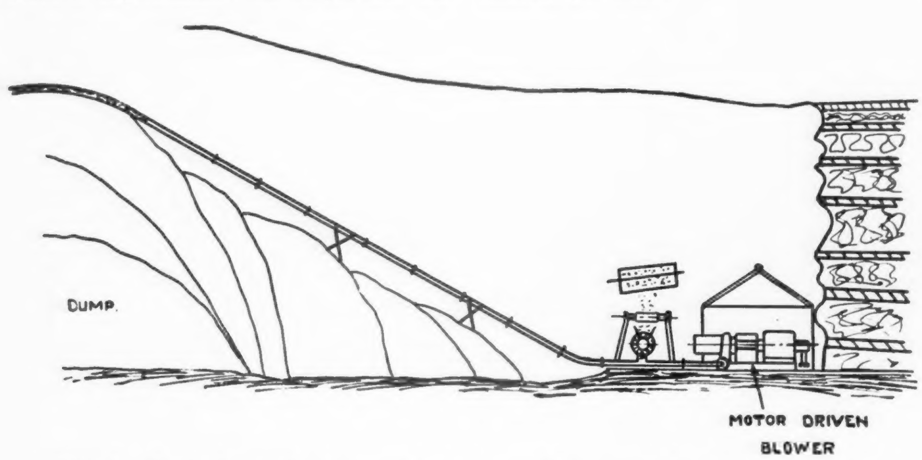
The material thus handled is a clay which has been separated from the rock in the process of preparing it for use in the manufacture of cement. It is fed to the discharge line of a high speed motor driven blower in which the air is traveling at a speed of approximately 350 ft. per sec., and it is expected to be able to transport it up to a distance of 600 ft. The installation is one in which a comparatively small amount of air is used, in comparison with the pressure.

The blower is stated to have a capacity of 1800 cu. ft. of free air per min. at a pressure of 12 lb. per sq. in.,and that it will be capable of handling up to 80 tons of material per hour.

The blower is driven by a variable speed motor through double helical gearing to step up the speed of the impeller, and the blower inlet is arranged with an automatic governing device which operates a rheostat to increase or decrease the speed of the motor and blower.

By this device any increased resistance in the discharge line due to an increased feed of clay causes the motor to speed up and increases the pressure in the discharge pipe, thus having the effect of clearing it, while any decreased feed and decreased resistance causes the motor to slow down.

This regulation is accomplished by means of an air governor operated by the variation in pressure across a flow nozzle fitted to the blower inlet. The pressure drop at the nozzle is proportioned to the volume of air passing through it. When this volume decreases due to an increased feed of material and a consequent increased resistance in the discharge line, the governor acts to overcome it by moving the rheostat to speed up the motor and blower, and when the volume passing through the inlet increases due to a lessened resistance and less feed, the governor in like manner slows up the motor and blower, thus maintaining the necessary



Showing how pipe and compressed air is used for conveying and disposing of material at English cement plant

pressure and velocity in the discharge line. The best pressure and velocity to float the material was determined from a series of experiments. The installation is at the plant of Charles Nelson and Co., at Stockton, near Rugby, England, and a description of it was originally published in the British *Quarry and Surveyors' and Contractors' Journal.*

Some Safety First Rules for Drillers

1. Don't attempt to make adjustments on the spudding or walking beam of a drilling machine while in motion. You might get struck or lose your balance and fall into the machinery.

2. Don't operate a drilling machine with gears exposed. Put gear guards on so your hands or clothes will not get caught in the cogs.

3. Don't stand in the line of fast moving belts or pulleys, unless they are properly covered.

4. Don't run a sand line cable after it has become worn considerably or develops a weak spot. It might break in pulling out and decapitate you.

5. Don't use a derrick with coil springs at the top under the crown pulley to absorb the shock and vibration when using wire rope. The springs will crystallize and break and may fall down on your head.

6. Don't hold wire rope with your bare hands while drilling. Get a pair of gloves or use a rope turner. There is danger of small steel particles getting into your hands and causing blood poison.

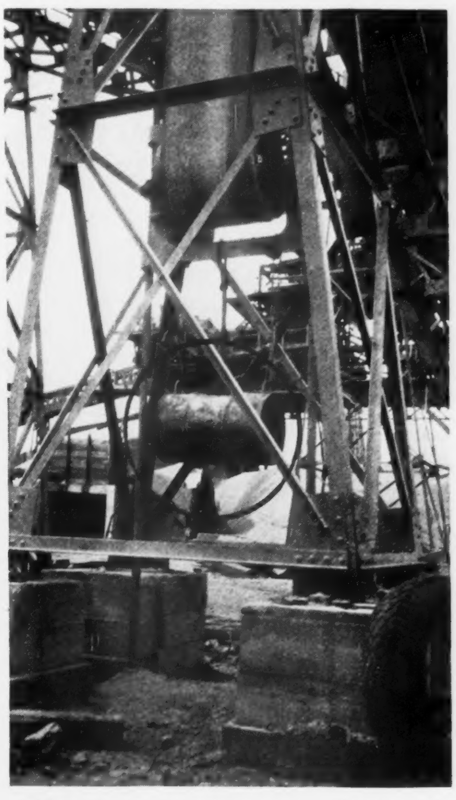
7. Don't climb up derricks coated with ice in freezing weather, without taking the necessary precautions to prevent slipping and falling.

8. Don't hitch a tractor on to the pole of a drilling machine and allow the derrick or crown pulley to extend over the head of the driver. The front axle might fail or the front wheels drop into a hollow, and drop the derrick on the head of the driver.—*The Armstrong Driller.*

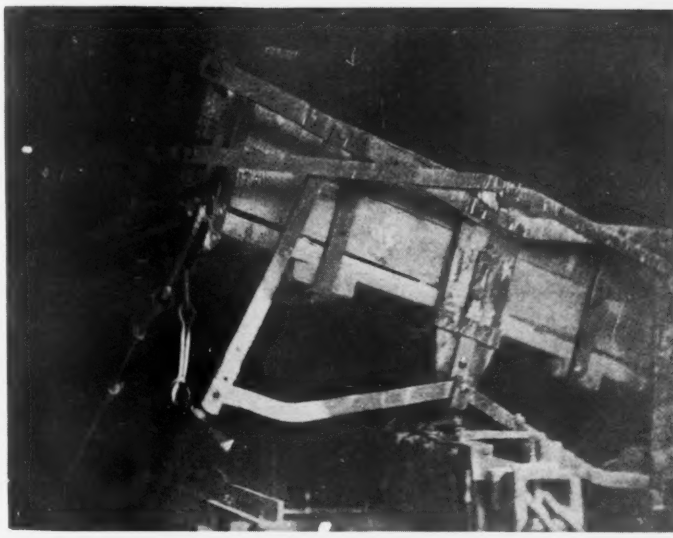
Empty oil barrels prove usable as bin foundation

Two Novel Uses for Empty Oil Barrels

AT the Paul Ales plant of the Material Service Corp., near Chicago, Ill., the accompanying views were taken. One shows a counter-weight for a conveyor belt take-up made by filling an empty oil barrel with concrete and suspending as shown. The other illustration shows how a bin foundation was provided by a similar expedient.



Oil barrel used as counter-weight for conveyor belt take-up



A hook with a short piece of cable fastened to the floor is used for pulling the car body back after dumping

Simplified Quarry Car Dumping and Hoisting Arrangement

AT THE CRUSHING PLANT of the France Quarries Co., at Kenton, Ohio, the slope of the incline track at the dumping platform is utilized in a simple and effective way to dump the quarry cars into the crusher. Side-dump cars of the Western type are used, and the slope of the track is enough so that if the car happens to be loaded heavy on the wrong side, it is allowed to drift back a little with a pole placed against the lower corner of the dump body in such a way as to dump it. Of course the cars are normally loaded heavy on the crusher side, so that dumping is usually a matter of knocking the chain hooks loose.

For pulling the car body back after dumping, a hook with a short piece of cable fastened to the floor is used. Hooking on the corner of the car body and letting the car drift back brings the body back to the horizontal, so that the chains may be hooked.

Hoisting on the incline is done with a friction drum hoist, with one operating lever which throws one way for hoisting and the other way for braking, and so arranged that it will "stay put" in the braking position. This lever is located alongside the track and opposite the dumping point, so that the operations of hoisting, dumping and re-hooking the chains are all done by one man.

Solving Oil Waste Problem

THE OPERATION of a sewage disposal plant in a large city was interfered with seriously by a soluble cutting fluid, containing an emulsifying agent, discharged from one of the local machine shops. After several experiments it was found that the addition of $Al_2(SO_4)_3$ to the oil waste destroyed the emulsion so that the oil could be separated. Filtration through sand removed the $Al(OH)_3$ proponent and enough lime was added to keep the filtrate at p_H 6-8.

Richard K. Meade

RICHARD K. MEADE, well known consulting chemist and engineer, Baltimore, Md., died Monday noon, October 13, according to a telegram received from Richard K. Meade and Co. As an expert in cement, lime and gypsum chemistry, Mr. Meade was one of the outstanding figures in his profession. His well-known book on portland cement, the standard reference work of the industry, and his contributions to ROCK PRODUCTS and other periodicals, made him familiar to readers. Incidentally, he was one of the committee of chemical authorities selected to judge the contributions in our "Chemists' Corner" contest.

Richard Kidder Meade was born in Charlottesville, Va., November 28, 1874. He was a graduate of the University of Virginia and received an honorary degree of M. S. from Lafayette College. His first commercial venture was as city editor of the *Independent-Herald*, Hinton, W. Va. In 1895 he was chemist for the Longdale Iron Co., Allegheny county, Va., and, later held the position of chief chemist of Edison Portland Cement Co., 1902; Northampton Portland Cement Co., 1903; Dexter Portland Cement Co., 1904.

Richard K. Meade

In 1904 he founded *The Chemical Engineer.* Four years later he became a director of the Meade Testing Laboratories, Allentown, Penn. During 1911 and 1912 he was general manager of the Tidewater Portland Cement Co., Baltimore. Since 1912 he had devoted the knowledge gained by his extensive experience to a consulting chemical and engineering practice. In addition to being the inventor of numerous processes and appliances of use in the cement and allied industries, Mr. Meade was the author of several books, various scientific papers and pamphlets. He was a quiet and unassuming gentleman, whose loss will be greatly felt by many personal friends.

The business of Richard K. Meade and Co. will be carried on by his associates, it is announced.

Iowa Cement Plants Are Busy on Road Contracts

LARGELY DUE to the influence of the $26,000,000 worth of road building to be completed in Iowa this year, the six operating Iowa portland cement plants are expected to turn out cement valued at approximately $13,000,000 at the plants.

This amount would be the value of the 8,030,000 bbl. of cement that will be manufactured during the year if the cement mills of the state continue their present rate of production. The six plants in the state are producing about 22,000 bbl. a day.

Mason City has two of the state's cement plants, and Des Moines, Valley Junction, Davenport and Gilmore City, one each. The total capacity of these mills, estimated at 10,000,000 bbl., has never been reached, this year's predicted production promising to be the highest in the history of the state.

The cement industry in Iowa, ranked as the eleventh industry in the state, this year is employing between 1400 and 1500 men. The annual payroll of the six plants is reported to approximate $2,000,000. The plants themselves represent a total capital investment of almost $16,000,000, figures show.

The production of cement in Iowa has grown steadily with the development of Iowa's paved road system, with the exception of 1924 and 1925. In 1921 the production was 4,151,000 bbl., slightly more than half of the output predicted for this year.

In 1922 production went up to 4,450,000 bbl. and in 1923, due to the opening of the Valley Junction plant, it went up to 5,500,000 bbl. The next year production was reduced about 4,700,000 bbl., and in 1925 it remained slightly under that figure.

Production figures advanced slowly in 1926 and in 1927 the total was up to 5,415,144 bbl. In 1928, the last year for which accurate figures are available, the state produced 7,070,172 bbl. of cement. It is estimated that figures for 1929 were slightly above this figure.

Following are figures showing cement production in Iowa: Plants in operation, six; plants not in operation, one; men employed, 1400 to 1500; annual payroll, $1,900,000; output daily, 22,000 bbl.; daily capacity output, 26,000 bbl.; estimated output for 1930, 8,030,000 bbl.; estimated value at plants for 1930, $13,000,000; coal used annually, 562,000 tons; raw material used annually, 2,409,000 tons; and capital investment, $16,000,000.—*Des Moines* (Ia.) *Register.*

Fight for Denver City Cement Business

PROSPECTS OF A FIGHT over the price of cement used on Denver, Colo., public improvements and the source from which it shall be purchased, were seen recently in the filing of a letter with the city council by the Monolith Portland Midwest Co. offering to sell cement to the city for 50 cents a barrel less than the prevailing prices.

Action of the Monolith company, which has a mill in Wyoming, renewed a battle that has raged on and off for several years between it and the Ideal Cement Co. over the question of supplying cement for public projects.

The letter filed with the city council by Coy Burnett, president of the Monolith company, will be followed by a demand for an open hearing before the council, Mr. Burnett, whose letter declared that "the price of portland cement which enters into practically every improvement in the city and county of Denver has been a long time $3.05 f.o.b. cars Denver."

The letter then states that public work in Denver is entitled to a lower price for cement than work scattered in small amounts over a variety of places, and charges that the company has sought to effect a saving for the taxpayers by creating competion, "but has been prevented from doing so by the actions of C. D. Vail, manager of parks and improvements."

"This has been a very serious loss to the taxpayers," the letter said. "To make the effect of it plain, this company hereby offers to furnish whatever cement is required for us by the city and county of Denver or any improvement district therein, and to any contractor doing work for the city and county of Denver, or for any improvement district or subdivision thereof, for the period commencing today and ending on the last day of December, 1931, at a price of $2.55, f.o.b. cars Denver, which is 50 cents a barrel less than the going price."

The letter then states that the company will guarantee the quality of its cement and post bond to perform the offer made.—*Denver* (Colo.) *Rocky Mountain News.*

Hartford, Conn., Sand and Gravel Producer Sells Ready-Mix Concrete

THE ATLAS SAND, GRAVEL, AND STONE CO., Hartford, Conn., has installed equipment at its plant that now furnishes ready-mixed concrete to clients. This machine scientifically proportions and mixes the materials, and produces a strong, quick-hardening concrete. A fleet of agitator trucks that turn and thoroughly mix the product while on the way to the job, are used between the plant and the place where the work is done.—*Hartford* (Conn.) *Times.*

Editorial Comment

OUR PLATFORM

¶ Greater Economy of Production; the Best in Machinery, Control Equipment; High Wages; Perfect Co-ordination. ¶ Comprehensive Organization of Industry for Research, Promotion. ¶ Retirement of the State from Competition with Private Business. ¶ Active Participation of Business Men in the Business of Government. ¶ The Promotion of Safety and Welfare of the Industry's Employes.

Fizzle: Federal Trade Practice Conferences

The announcement of the Federal Trade Commission that it will proceed with a revision of the codes of trade practice adopted with considerable formality by one hundred or more industries (including three in the rock products industry) notwithstanding the protests of the said industries, we believe entirely justifies our often expressed skepticism of the value of Trade Practice Conferences as conducted by the Federal Trade Commission. Long ago we noted in these columns that these codes were rapidly being generalized to a few fundamental principles, as applicable to one industry as to another, when actual conditions in the various industries proved that the real difficulties usually arose from bad practices more or less peculiar to them.

In some of the codes accepted by the Federal Trade Commission these bad practices were occasionally described and condemned in the so-called Group 2 rules—defined by the Commission as mere "expressions of the trade," which the Commission admitted it had no power to enforce, but giving the impression always to the interested industries that it could use much "moral 'suasion" on occasion, to see that they were lived up to.

Now the Commission, from necessity it must be admitted, disowns its Group 2 rules entirely, because the courts have ruled it has no power to make or accept such rules, and because, it it alleged, some industries have used such rules to violate the anti-trust laws. The revision of the codes then means that they are to be boiled down to the general statement of the Group 1 rules, which are themselves but restatements of various federal statutes. Those who at considerable expense of travel and mental effort sat through a one- or two-day session and adopted these codes in solemn conclave are now left in the position merely of having assembled and jointly agreed to obey the prevailing law of the land relating to trade and commerce.

Whatever good the various trade practice conferences have accomplished is in the education of responsible men in the industries along the line of lawful and ethical business conduct. We believe this could have been done—and in one or two instances we know of has been done—just as effectively—if not more so—without the help of the Federal Trade Commission; and the Federal Trade Commission by its subsequent stand, instead of having lent prestige to its conferences, has actually left the participating industries in a rather ridiculous position, where they must hold another trade conference "on their-own" to correct obviously unethical if not unlawful practices, or forget the matter altogether.

As the sand and gravel producers of Texas have well said, the purpose of a written code is to help "men to think clearly and correctly and to act honorably." The revised codes of the Federal Trade Commission will fill the bill only in that they help men to know (perhaps for the first time) and to understand some rather (so far as these industries are concerned) obscure federal statutes.

Make Economic Law Federal Law?

Various newspapers have made statements, similar to the following, which appeared in the *Wall Street Journal* (New York City): "A distinct Administration leaning toward modification of the Sherman anti-trust law is seen in President Hoover's recent speech before the American Federation of Labor at Boston"—which is enlarged upon at length.

Probably, the President realizes that the Federal Trade Practice Conferences, which he was quite instrumental in promoting as Secretary of Commerce, have fallen rather flat, on account of the Sherman law—if we face the real facts. Any revision of the Sherman law means but one thing to producers—the right, or privilege, more or less circumscribed, of course, to enter into agreements in restraint of competition—or, in the language of the Sherman law literature, "in restraint of trade"—or, in the language of economists, permitting "equalization of production to consumption." For lack of ability to do this under present anti-trust laws the managers of industry were rather unjustly blamed for the present business depression by the American Federation of Labor.

But we should not put too much faith in a revision of the Sherman law. Portland cement producers today, for example, have facts and statistics necessary, as individuals to equalize production and consumption; indeed storage facilities and the more or less perishable nature of the commodity make balancing production and consumption a present reality. Yet the cement industry suffers from the same disease of price-cutting as all others. Why? The answer, of course, is that there are always some producers who ignore economic laws regardless of subsequent penalties to themselves and to the industry. If economic laws can be successfully framed as federal statutes, it may be that these rebels to the orderly conduct of industry can be brought into line; on that hope solely rests any good to come from revision of the Sherman law.

Financial News and Comment

RECENT QUOTATIONS ON SECURITIES IN ROCK PRODUCTS CORPORATIONS

Stock	Date	Bid	Asked	Dividend
Allentown P. C. 1st 6's[29]	10-21-30	95½	97½	
Alpha P. C. new com.[2]	10-18-30	22	23	50c qu. Oct. 25
Alpha P. C. pfd.[2]	10-18-30	117	....	1.75 qu. Mar. 15
American Aggregates com.	10-21-30	12	16	75c qu. Mar. 1
Am. Aggr. 6's, bonds	10-21-30	68	....	
American Brick Co., sand-lime brick	10- 6-30	4½	....	25c qu. Feb. 1
American Brick Co. pfd.	10-20-30	....	60	50c qu. May 1
Am. L. & S. 1st 7's[29]	10-21-30	98	99	
American Silica Corp. 6½'s[49]	10-21-30	No market		
Arundel Corp. new com.	10-20-30	39½	40	75c qu. Oct. 1
Atlantic Gyp. Prod. (1st 6's & 10 sh. com.)[10]	10-21-30	No market		
Beaver P. C. 1st 7's[20]	10-17-30	94	96	
Bessemer L. & C. Class A[4]	10-17-30	29	31	75c qu. Nov. 1
Bessemer L. & C. 1st 6½'s[4]	10-17-30	....	94	
Bloomington Limestone 6's[29]	10-21-30	70	75	
Boston S. & G. new com.[47]	10-18-30	16	19	40c qu. Oct. 1
Boston S. & G. new 7% pfd.[47]	10-18-30	46	50	87½c qu. Oct. 1
California Art Tile A	10-17-30	....	8	43¾c qu. Mar. 31
California Art Tile B[50]	10-16-30	....	5	20c qu. Mar. 31
Calaveras Cement com.	10-17-30	....	12	
Calaveras Cement 7% pfd.	10-17-30	....	88	1.75 qu. Oct. 15
Canada Cement com.	10-20-30	14	14¼	
Canada Cement pfd.	10-20-30	93	94	1.62½ qu. Sept. 30
Canada Cement 5½'s[43]	10-17-30	100	101	
Canada Cr. St. Corp. bonds[43]	10-17-30	93	97	
Certainteed Prod. com.	10-20-30	4⅜	4⅝	
Certainteed Prod. pfd.	10-20-30	20	21	1.75 qu. Jan. 1
Cleveland Quarries	10-20-30	65	70	75c qu. 25c ex. Sept. 1
Columbia S. & G. pfd.	10- 6-30	89	94	
Consol. Cement 1st 6½'s, A	10- 7-30	70	80	
Consol. Cement. 6½% notes	10-21-30	60	65	
Consol. Cement pfd.[29]	10-21-30	50	60	
Consol. Oka S. & G. 6½'s[12] (Canada)	10-18-30	99	101	
Consol. Rock Prod. com.[9]	10-16-30	1½	2½	
Consol. Rock Prod. pfd.[9]	10-16-30	9	11	43¾c qu. June 1
Consol. Rock Prod. units	10-20-30	12	17	
Consol. S. & G. pfd. (Can.)	10-20-30	....	85	1.75 qu. Aug. 15
Construction Mat. com.	10-16-30	13	14½	
Construction Mat. pfd.	10-16-30	37	....	87½c qu. Nov. 1
Consumers Rock & Gravel, 1st Mtg. 6's, 1948[18]	10-16-30	88	93	
Coosa P. C. 1st 6's[29]	10-21-30	50	55	
Coplay Cem. Mfg. 1st 6's[40]	10-18-30	95	....	
Coplay Cem. Mfg. com.[40]	10-18-30	10	....	
Coplay Cem. Mfg. pfd.[40]	10-18-30	60	....	
Dewey P. C. 6's (1930)[30]	10-21-30	98	....	
Dewey P. C. 6's (1931-37)[30]	10-21-30	98	....	
Dolese & Shepard	10-20-30	75	78	$2 qu. Oct. 1
Dufferin Pav. & Cr. Stone com.	10-20-30	....	15	
Dufferin Pav. & Cr. Stone pfd.	10-20-30	....	83	1.75 qu. Oct. 1
Edison P. C. com.[39]	10-18-30	10c	....	
Edison P. C. pfd.[39]	10-18-30	25c	....	
Giant P. C. com.[2]	10-18-30	5	10	
Giant P. C. pfd.[2]	10-18-30	10	20	1.75 s.-a. June 16
Gyp. Lime & Alabastine, Ltd.	10-20-30	13	13½	37½c qu. Oct. 1
Hermitage Cement com.[11]	10-18-30	30	40	
Hermitage Cement pfd.[11]	10-18-30	80	85	
Ideal Cement, new com.	10-20-30	52½	54½	75c qu. Oct. 1
Ideal Cement 5's, 1943[33]	10-20-30	99½	100½	
Indiana Limestone units[29]	10-21-30	....	80	
Indiana Limestone 6's	10-21-30	63	....	
International Cem. com.	10-20-30	57	57⅜	$1 qu. Sept. 30
International Cem. bonds 5's	10-20-30	98⅝	....	Semi-ann. int.
Iron City S. & G. bonds 6's[46]	10-17-30	87	90	
Kelley Is. L. & T. new stock	10-20-30	35½	37	62½c qu. Oct. 1
Ky. Cons. St. com. V.T.C.[48]	10-21-30	8½	10	
Ky. Cons. Stone 6½'s	10-20-30	93¼	95¾	
Ky. Cons. Stone pfd.	10-20-30	85	90	1.75 qu. Aug. 1
Ky. Cons. Stone com.	10-20-30	8½	10	
Ky. Rock Asphalt com.[11]	10-18-30	13	15	40c qu. Oct. 1
Ky. Rock Asphalt pfd.[11]	10-18-30	76	80	1.75 qu. Sept. 1
Ky. Rock Asphalt 6½'s[11]	10-18-30	90	100	
Lawrence P. C.	10-18-30	60	66	$1 qu. Sept. 30
Lawrence P. C. 5½'s, 1942[2]	10-18-30	86	88	
Lehigh P. C.	10-20-30	16½	17	25c qu. Nov. 1
Lehigh P. C. pfd.	10-20-30	100	103	1¾% qu. Oct. 1
Louisville Cement[48]	10-20-30	250	....	
Lyman-Richey 1st 6's, 1932[13]	10-18-30	92	99	
Lyman-Richey 1st 6's, 1935[13]	10-18-30	97	99	
Marblehead Lime 6's[14]	10-17-30	90	95	
Marbelite Corp. com. (cement products)	10-16-30	100	....	
Marbelite Corp. pfd.	9-20-30	12	....	50c qu. Oct. 10
Material Service Corp.	10-20-30	16	19	50c qu. Sept. 1
McCrady-Rogers 7% pfd.[22]	10-16-30	52	55	
McCrady-Rogers com.[22]	10-16-30	17	20	
Medusa Portland Cement	10-20-30	....	90	1.50 Oct. 1
Mich. L. & C. com.[6]	10-18-30	25	....	
Missouri P. C.	10-20-30	29	29½	50c qu. Aug. 1
Monolith Portland Midwest[9]	10-16-30	2½	3½	
Monolith bonds, 6's[9]	10-16-30	80	85	
Monolith P. C. com.[9]	10-16-30	4½	5½	40c s.-a. Jan. 1
Monolith P. C. pfd.[9]	10-16-30	3½	4½	40c s.-a. Jan. 1
Monolith P. C. units[9]	10-16-30	12½	15	
National Cem. (Can.) 1st 7's[43]	10-17-30	99½	100½	
National Gypsum A com.	10-20-30	4½	5½	
National Gypsum pfd.	10-20-30	25	28	
Nazareth Cement com.[26]	10-18-30	17	22	
Nazareth Cement pfd.[26]	10-18-30	99	....	
Newaygo P. C. 1st 6½'s[29]	10-21-30	100½	101½	
New Eng. Lime 1st 6's[14]	10-17-30	75	80	
N. Y. Trap Rock 1st 6's	10-20-30	102	....	
N. Y. Trap Rock 7% pfd.[36]	10- 6-30	95	....	1.75 qu. Oct. 1
North Amer. Cem. 1st 6½'s	10-21-30	54½	56	
North Amer. Cem. com.[29]	10-21-30	2½	3	
North Amer. Cem. 7% pfd.[29]	10-21-30	17	25	
North Shore Mat. 1st 5's[15]	10-21-30	95	....	
Northwestern States P. C.[37]	10-18-30	110	120	$2 Apr. 1
Ohio River Sand com.	10-20-30	....	15	
Ohio River Sand 7% pfd.	10-20-30	....	97	
Ohio River S. & G. 6's[16]	10-18-30	90	95	
Oregon P. C. com.[9]	10-16-30	....	14	
Oregon P. C. pfd.[9]	10-16-30	....	95	
Pacific Coast Aggr. com.[50]	10-16-30	2½	5	
Pacific Coast Aggregates pfd.	10-20-30	....	6	
Pacific Coast Cement 6's[5]	10-16-30	75½	76	
Pacific P. C. com.	10-17-30	14	17	
Pacific P. C., new pfd.[5]	10-16-30	75	79	1.62½ qu. Oct. 4
Pacific P. C. 6's[5]	10-16-30	99	....	
Peerless Cement com.[21]	10-18-30	7⅞	8¼	
Peerless Cement pfd.[21]	10-18-30	70	80	1.75 Oct. 1
Penn.-Dixie Cement pfd.	10-20-30	27	29½	
Penn.-Dixie Cement com.	10-20-30	4	4½	
Penn.-Dixie Cement 6's[5]	10-21-30	79½		
Penn. Glass Sand Corp. 6's	10- 8-30	102½	103½	
Penn. Glass Sand pfd.	10- 8-30	103½	....	1.75 qu. Oct. 1
Petoskey P. C.	10-20-30	7	8	15c qu. Apr. 1
Port Stockton Cem. com.[5]	10-16-30	No market		
Riverside Cement com.	10-17-30	....	14	
Riverside Cement pfd.[20]	10-17-30	73	75	1.50 qu. Aug. 1
Riverside Cement, A[20]	10-17-30	11	14½	31¼c qu. Aug. 1
Riverside Cement, B[20]	10-17-30	2	....	
Roquemore Gravel 6½'s[17]	10-18-30	98	100	
Santa Cruz P. C. 1st 6's, 1945[5]	10-16-30	104¼	....	6% annually
Santa Cruz P. C. com.	10-17-30	85	....	$1 qu. Oct. 1
Schumacher Wallboard com.	10-17-30	8	9½	
Schumacher Wallboard pfd.	10-17-30	....	23½	50c qu. Aug. 15
Southwestern P. C. units[44]	10-16-30	240	....	
Standard Paving & Mat. (Canada) com.	10-20-30	15	15½	50c qu. Aug. 15
Standard Paving & Mat. pfd.	10-20-30	....	83½	1.75 qu. Aug. 15
Superior P. C., A[20]	10-17-30	33	35	27½c mo. Nov. 1
Superior P. C., B[20]	10-17-30	10	13	25c qu. Sept. 20
Trinity P. C. units[37]	10-18-30	130	140	
Trinity P. C. com.[37]	10-18-30	30	40	
Trinity P. C. pfd.[29]	10-21-30	107	110	
U. S. Gypsum com.	10-20-30	39½	39¾	40c qu. Sept. 30
U. S. Gypsum pfd.	10-20-30	120	121	1.75 qu. Sept. 30
Universal G. & L. com.[3]	10-21-30	No market		
Universal G. & L. pfd.[3]	10-21-30	No market		
Universal G. & L., V.T. C.[3]	10-21-30	No market		
Universal G. & L. 1st 6's[3]	10-21-30	No market		
Warner Co. com.[16]	10-18-30	32	37	50c qu. & 25c ex. Oct. 15
Warner Co. 1st 7% pfd.[16]	10-18-30	98	100	1.75 qu. Oct. 1
Warner Co. 1st 6's[8]	10-21-30	98	100	
Whitehall Cem. Mfg. com.[36]	10- 6-30	80	....	
Whitehall Cem. Mfg. pfd.[36]	10- 6-30	50	....	
Wisconsin L. & C. 1st 6's[15]	10-21-30	95	....	
Wolverine P. C. com.	10-20-30	....	4½	15c qu. Aug. 15
Yosemite P. C., A com.[9]	10-16-30	2	3	

Quotations by: [1]Watling Lerchen & Hayes Co., Detroit, Mich. [2]Bristol & Willett, New York. [3]Rogers, Tracy Co., Chicago. [4]Butler Reading & Co., Youngstown, Ohio. [5]Smith, Camp & Co., San Francisco, Calif. [6]Frederic H. Hatch & Co., New York. [7]J. J. B. Hilliard & Son, Louisville, Ky. [8]Dillon, Read & Co., Chicago, Ill. [9]A. E. White Co., San Francisco, Calif. [10]Lee Higginson & Co., Boston and Chicago. [11]J. W. Jakes & Co., Nashville, Tenn. [12]James Richardson & Sons, Ltd., Winnipeg, Man. [13]Stern Bros. & Co., Kansas City, Mo. [14]First Wisconsin Co., Milwaukee, Wis. [15]Central Trust Co. of Illinois. [16]J. S. Wilson, Jr., Co., Baltimore, Md. [17]Citizens Southern Co., Savannah, Ga. [18]Dean, Witter & Co., Los Angeles, Calif. [20]Tucker, Hunter, Dulin & Co., San Francisco, Calif. [21]Baker, Simon & Co., Inc., Detroit, Mich. [22]Peoples-Pittsburgh Trust Co., Pittsburgh, Penn. [24]A. B. Leach & Co., Inc., Chicago, Ill. [25]Richards & Co., Philadelphia, Penn. [26]Hincks Bros. & Co., Bridgeport, Conn. [28]Bank of Republic, Chicago, Ill. [29]National City Co., Chicago, Ill. [30]Chicago Trust Co., Chicago, Ill. [33]Boettcher Newton & Co., Denver, Colo. [36]Hanson and Hanson, New York. [37]S. F. Holzinger & Co., Milwaukee, Wis. [39]Tobey and Kirk, New York. [40]Steiner, Rouse and Stroock, New York. [43]Jones, Heward & Co., Montreal, Que. [44]Tenney, Williams & Co., Los Angeles, Calif. [46]Stein Bros. & Boyce, Baltimore, Md. [47]Wise, Hobbs & Arnold, Boston. [48] E. W. Hays & Co., Louisville, Ky. [49]Blythe Witter & Co., Chicago, Ill. [50]Martin Judge Co., San Francisco, Calif. [51]Hemphill, Noyes & Co., New York City.

INACTIVE ROCK PRODUCTS SECURITIES (Latest Available Quotations)

Stock	Price bid	Price asked
Consolidated Cement com. v.t.c., 3220 shs.[1]	1½ per share	....
Universal Gypsum and Lime, 300 shs.[3]	$4 for the lot	....
Universal Gypsum and Lime, 200 shs.[3]	$2 for the lot	....
Holliston Trap Rock Co. com.,[2] 67 shs., per sh.	35	....

[1]Price at auction by Wise, Hobbs & Arnold, Boston, Dec. 18, 1929. [2]Price at auction by R. L. Day & Co., Boston, July 16, 1930. [3]Price at auction by Adrian H. Muller & Son, New York, August 6, 1930.

International Cement Earnings

THE CONSOLIDATED profit and loss statement of the International Cement Corp., New York City, and subsidiaries, giving results from operations in the third quarter of 1930 as compared with the first and second quarters of 1930, is given as follows:

	Third quarter 1930	Second quarter 1930	First quarter 1930
Gross sales	$9,638,985.49	$9,051,665.56	$7,239,744.50
Less: Packages, discounts and allowances	1,863,847.93	1,751,906.80	1,424,843.86
Net sales	$7,775,137.56	$7,299,758.76	$5,814,900.64
Manufacturing cost excluding depreciation	$3,618,327.78	$3,549,047.14	$2,930,576.67
Depreciation	880,634.32	788,907.71	491,037.47
	$4,498,962.10	$4,337,954.85	$3,421,614.14
Manufacturing profit	$3,276,175.46	$2,961,803.91	$2,393,286.50
Shipping, selling and administrative expenses	1,276,834.24	1,228,387.27	1,150,865.94
Net profit	$1,999,341.22	$1,733,416.64	$1,242,420.56
Less: Interest charges and financial expenses	187,215.78	187,962.54	192,314.35
	$1,812,125.44	$1,545,454.10	$1,050,106.21
Reserve for federal taxes and contingencies	417,122.45	335,171.63	208,625.58
Net to surplus	$1,395,002.99	$1,210,282.47	$841,480.63

From the foregoing it will be noted that the net to surplus for the nine months is $3,446,766.09. These earnings after allowing for interest on gold debentures are equivalent to $5.44 per share on 633,452 shares of common stock outstanding on Septmeber 30, 1930, as compared with $3,527,764.58, equal to $5.70 per share on 619,049 shares outstanding on September 30, 1929.

Commenting on this quarterly statement the *Chicago* (Ill.) *Journal of Commerce* says in part:

"The favorable situation of the International Cement Corp. with regard to markets in the interior of the United States has probably been responsible in large measure for the excellent income record for the second and third quarters of this year. Other factors of considerable moment in the company's showing have bene the economies effected in operations at the several plants, and a sharp upturn in the demand for the company's special cement.

"Net profits of International Cement for the entire 1930 year have been estimated at approximately $7.50 a share or only slightly below the 1929 figure. Net income for all of last year amounted to $4,950,433 or $7.88 a share on 627,865 shares of common stock outstanding at the close of the period. The 1929 year was the second largest in the history of the company from the standpoint of earnings, a peak of $5,149,388 or $7.90 a common share having been reached in 1928.

"In view of the situation prevailing generally throughout most construction lines, the performance of International Cement in the first three quarters of 1930 is considered satisfactory. For the three months to March 31, 1930, a net income of $841,480 or $1.34 a common share was returned, representing a substantial decline from the net of $1,017,619 or $1.64 a share returned in the same three months of 1929. In the two succeeding quarterly periods, the profits again exceeded the 1929 figures, and compared favorably with the same quarters in other previous years. As a result of the sharp decline in the first quarter, net income of the corporation for the nine months to September 30 also showed some recession from the 1929 total, with a net of $3,446,766 or $5.44 a share, compared with 1929 of $3,527,764 or $5.70 on a smaller number of common shares.

Quarterly Income Figures Compared

"The corporation's quarterly record of net income for the last four years follows in detail:

Quarters ended—	1930	1929	1928	1927
March 31	$841,480	$1,017,619	$1,067,928	$906,292
*A share	1.34	1.64	1.51	1.31
June 30	1,210,282	1,149,789	1,128,529	1,142,253
A share	1.91	1.86	1.68	1.73
September 30	1,395,003	1,360,356	1,417,916	1,234,973
A share	2.20	2.20	2.29	1.90
December 31	....	1,381,468	1,514,909	1,271,194
A share	......	2.20	2.45	1.96
Nine months to September 30	3,446,766	3,527,764	3,614,374	3,283,519
*A share	5.44	5.70	5.48	4.94

*Based on stock outstanding at end of quarterly periods and average number of shares for nine months' periods.

"September business of the International Cement Corp. was particularly good, an increase of 33% in net income being shown after all charges and taxes, as compared with the 1929 total for the same month. A large number of public utilities have been expanding their physical plants this year, with a dual purpose in view, that of provision for future expansion to meet a growing demand, and the utilization of the large supply of labor currently available for construction purposes during this period of lower commodity prices. As a result of this situation the company's high-early-strength cement, commanding a somewhat higher price than portland cement, has been in good demand.

"The International Cement Corp. is probably in the best position of any of the cement makers. The corporation is one of the leading manufacturers of cement in the domestic market, serving the entire territory east of the Rocky Mountains, and in addition has a number of plants in Cuba, Uruguay and the Argentine. Thirteen plants are operated, and at the close of 1929 these had a total capacity of 22,300,000 bbl. The production capacity has been tripled in the last five years, both through the acquisition of additional plants and the enlargement of those already owned.

"Operating properties of the International group are located in the states of New York, Kansas, Texas, Virginia, Pennsylvania, Louisiana, Indiana, Alabama and in Cuba, Uruguay and Argentina. The distribution of the manufacturing facilities suggests the manner in which the organization has prepared to serve the interior states of this country. All but four of the domestic plants are equipped for burning oil fuel, the Cuban plant also being equipped to burn oil.

"Previous to 1930, cement was imported into the United States free of tariff duty, but since the new rates were adopted an import duty of 6 cents per 100 lb. has been provided. While it is not expected that this duty will equalize production costs at home and abroad, so that competition for the foreign product will remain fairly strong in the seaboard states, some benefit is expected to be obtained, particularly by the states farther inland. There has been an over-extension of productive capacity throughout the entire cement industry and to the extent that this condition continues, tariff measures will not be a sufficient remedy for the unfavorable conditions of the cement business. With the adoption of extensive programs of public improvement and the growth of public utility systems, the trend of cement construction has been definitely upward and new uses have been developed from time to time.

"Despite its record of continuous dividend payments at a favorable rate, International Cement Corp. has been able to maintain its plant at a high level of efficiency, making liberal charges for depreciation, and has had a substantial balance each year for reinvestment in additional manufacturing facilities or for the enlargement of the working capital. The net values of the fixed properties have about tripled in the last five years and amounted to $43,854,300 at the close of 1929. A total of $5,291,000 was invested in 1929, including the depreciation and depletion reserves and the surplus after dividends. An issue of convertible debentures was sold in 1928, amounting to approximately $18,000,000, and the funds realized, together with $2,500,000 obtained from the sale of additional stock, were used for the retirement of preferred stock, leaving a balance of new capital.

Recent Dividends Announced

Bessemer Limestone and Cement Cl. A (qu.)	$0.75	Nov. 1
Construction Materials pfd. (qu.)	0.87½	Nov. 1
Marbelite Corp. pfd. (qu.)	0.50	Oct. 10

Alpha Cement Earnings

THE report of Alpha Portland Cement Co., Easton, Penn., for the 12 months ended September 30, 1930, shows net income of $1,280,017 after depreciation, federal taxes, etc., equivalent, after 7% preferred dividends, to $1.60 a share on 711,000 no-par shares of common stock. This compares with $1,989,345 or $2.60 a common share in the 12 months ended September 30, 1929.

Consolidated income account for 12 months ended September 30, 1930, compares as follows:

	1930	1929
Net sales	$10,294,030	$12,373,664
Operating expenses	7,706,667	9,132,009
Depreciation	1,383,594	1,266,721
Operating profit	$1,203,769	$1,974,934
Other income (net)	228,372	288,815
Total income	$1,432,141	$2,263,749
Federal taxes	152,124	274,404
Net income	$1,280,017	$1,989,345
Preferred dividends	140,000	140,000
Common dividends	1,777,500	2,133,000
Deficit	$637,483	$283,655

The consolidated balance sheet as of September 30, was as follows:

ASSETS

	1930	1929
*Property account	$21,495,585	$22,236,204
Current assets:		
Cash	5,696,939	2,938,157
Call loans	....	2,600,000
U. S. bonds, etc.	1,357,975	1,357,975
Work funds and advances	192,906	155,754
Accounts and notes receivable	957,331	1,095,466
Inventories	2,236,986	2,485,053
Miscellaneous investments	273,079	220,967
Deferred charges	131,405	335,289
Total	$32,342,206	$33,424,865

LIABILITIES

	1930	1929
Preferred stock	$ 2,000,000	$ 2,000,000
†Common stock	24,134,500	24,134,500
Current liabilities:		
Accounts payable	324,611	391,203
Wages payable	71,393	84,954
Federal tax reserve, etc.	276,820	386,667
Dividends payable	355,500	533,250
Insurance and other reserves	745,086	822,513
Earned surplus	4,434,296	5,071,778
Total	$32,342,206	$33,424,865
Current assets	$10,442,137	$10,632,405
Current liabilities	1,028,324	1,396,174
Working capital	$ 9,413,813	$ 9,236,231

*After depreciation, depletion, etc. †Represented by 711,000 no-par shares.

Schumacher Wall Board Corp. Expands Holdings, in Gypsum Products

SCHUMACHER WALL BOARD Corp., San Francisco, Calif., has acquired a controlling interest in Gypsum Products Corp. of Seattle, Wash., it is announced by R. H. Shainwald, president, through acquisition of additional stock in the company which brings the Schumacher corporation holdings up to 66⅔% of the total outstanding capital stock from 50% ownership.

Organized in 1928, the Gypsum Products Corp. represents a merger of Schumacher Wall Board Corp.'s Seattle plant and Western Wall Board Co. of that city. Up until the present, ownership has been shared equally between the two companies. Terms of Schumacher's additional stock purchase from Western Wall Board Co. were not made public.

The Gypsum Products Corp. has just completed a new plant, Mr. Shainwald said, which will increase capacity by 25%, besides permitting the unit to turn out a product comparable to that now being manufactured in the Schumacher Los Angeles plant.

Earnings for the current fiscal year, according to Mr. Shainwald, are progressing at a satisfactory rate, considering prevailing business conditions. For the year ended April 30, last, earnings of $97,207 were reported, equal to $1.47 a share on 66,000 common shares outstanding.

Petoskey Omits Dividends

STOCKHOLDERS of the Petoskey Portland Cement Co., Petoskey, Mich., have been informed, it is reported, that owing to prevailing business conditions the consumption of cement has been reduced to about 70% of the industry's productive capacity. Sales of the company have been correspondingly affected and its present inventory of finished cement is approximately 400,000 bbl.

In order to maintain a satisfactory cash position, and in line with what many other large businesses have deemed good policy under existing conditions, the directors concluded it advisable to defer the payment of regular quarterly dividends of October 1 and December 31 until they feel that general conditions and the company's own position will justify their payment.

The company is said to have made money this year, although earnings have not been all hoped for. The financial condition is reported to be excellent and the properties have been kept up in first-class condition.

Consolidated Cement Balance Sheet, August 31

THE BALANCE SHEET of the Consolidated Cement Corp., Chicago, Ill., as of August 31, is reported as follows:

ASSETS

	Aug. 31, 1930	Dec. 31, 1929
Plant and equipment	$6,571,326	$6,415,522
Good-will	1	1
Current assets:		
Accounts and notes receivable (net)	380,177	330,369
Cash	377,734	562,806
Inventories	709,545	667,215
Investments, etc.	50,187	99,703
Unamortized bond discounts, etc.	304,809	380,891
Prepaid expense	64,755	....
Total	$8,458,534	$8,456,507

LIABILITIES

	Aug. 31, 1930	Dec. 31, 1929
Preferred stock	$1,392,800	$1,392,800
*Common stock	100,950	100,950
Capital surplus	727,200	727,200
Earned surplus	181,049	268,250
Bonded debt	4,760,800	4,810,100
Current liabilities:		
Accounts payable, etc.	240,049	280,469
Reserve for depreciation	1,043,576	801,334
Reserve for contingencies	....	75,404
Deferred liabilities	12,110	....
Total	$8,458,534	$8,456,507
Current assets	$1,467,456	$1,560,390
Current liabilities	240,049	280,469
Working capital	$1,227,407	$1,279,921

*Represented by 100,000 no-par shares.

Pennsylvania-Dixie Cement Earnings

REPORT of Pennsylvania-Dixie Cement Corp., New York City, and subsidiaries for 12 months ended September 30, 1930, shows a consolidated net profit of $417,192 after depreciation, depletion, interest and federal taxes, equivalent to $3.07 a share on 135,888 shares of 7% preferred stock. This compares with $686,072 or $5.05 a share on preferred for the 12 months ended September 30, 1929.

Consolidated income account for 12 months ended September 30, 1930, compares:

	1930	1929
Operating profit	$2,552,762	$2,930,414
Depreciation and depletion	1,386,517	1,397,257
Interest	681,369	710,980
Federal taxes	67,684	136,105
Net profit	$417,192	$686,072

Consolidated balance sheet of Pennsylvania-Dixie Cement Corp. as of September 30, 1930, compares as follows:

ASSETS

	1930	1929
*Land, buildings, equipment, etc.	$24,601,339	$25,480,849
Cash	2,813,902	2,332,997
Notes and accounts receivable	1,065,113	1,419,154
Inventories	2,699,586	2,710,614
Miscellaneous investments	402,918	84,100
Insurance fund and employes' stock account	158,950	35,000
Deferred charges	11,818	85,959
Total	$31,753,626	$32,148,673

LIABILITIES

	1930	1929
Preferred stock	$13,588,800	$13,588,800
†Common stock	4,000,000	4,000,000
Gold bonds	10,929,000	11,789,000
Accounts payable	205,242	166,756
Accrued tax, interest, etc.	185,304	214,845
Federal tax reserve	165,586	164,459
Miscellaneous reserves	249,588	205,637
Surplus	2,430,106	2,019,176
Total	$31,753,626	$32,148,673

*After depreciation and depletion. †Represented by 400,000 no-par shares.

Medusa Cement Earnings

BUSINESS of the Medusa Portland Cement Co. is better, with operations running between 70 and 75% of capacity, according to P. G. Dawson, secretary, in a statement to the *Cleveland* (Ohio) *News*, the latter part of September. The company earned more than dividend requirements for the period, he said.

Directors declared the regular quarterly dividends of $1.50 on the common and preferred, both payable October 1 to stock of record September 25.

Bessemer Limestone Earnings

THE BESSEMER LIMESTONE AND CEMENT CO., Youngstown, Ohio, has declared the regular quarterly dividend of 75 cents on class A, payable November 1 to stock of record October 20.

For the nine months ended September 30 net profit was $316,542 after all charges, including depreciation and federal taxes, equal, after class A dividend requirements, to $2.04 a share on 100,000 shares of no par class B stock. This compares with net profit of $332,466, or $2.19 a class B share, in the first nine months of 1929.

F. H. Rutschow Joins Mohawk Limestone Products Co.

F. H. RUTSCHOW, for eight years assistant superintendent of the National Mortar and Supply Co., Gibsonburg, Ohio, and more recently connected with the Gibsonburg Lime Products Co. of Gibsonburg, has been appointed general manager of the Mohawk Limestone Products Co., of Mohawk, N. Y.

Although Mr. Rutschow's activities, until the past year, have been centered in the Middle West, he is well known throughout the lime industry. To his new duties as general manager of Mohawk he brings a long experience in engineering, sales and management work in connection with lime products. He has gained a reputation in the industry for sound and constructive operating and merchandising policies.

Coincident with the announcement of Mr. Rutschow's appointment, the Mohawk Limestone Products Co. also announces extensive improvements and extensions to its plant at Jordanville, Herkimer county, where it owns one of the largest limestone deposits in New York state. These additions include three large concrete silos for storing pulverized limestone and hydrated lime; steel storage building for crushed stone, and new tracks, sidings, and switches which permit simultaneous loading of several cars of each product.

In addition to its Jordanville works, the Mohawk company operates a large gravel and sand plant at Bloods Mills, N. Y. The company has recently created much interest and comment by the operation of its own farm for experimental and research work.

The Mohawk company has the reputation of operating at Jordanville one of the most modern plants for producing high-grade limestone, agricultural and mason's hydated lime, and crushed stone. It has also recently added the manufacture of chemical and spraying lime.

Salem, Mass., Municipal Quarry Has Blasting Accident

STATE and city agencies have started a probe of the mysterious blast yesterday at the Salem city stone-crushing plant which killed one man, injured eight others, one perhaps fatally, and destroyed a boiler room and furniture warehouse near by on Friday, October 10.

The first step of the investigation revealed that an old charge might have been exploded when workmen blasting a section of the rock set off dynamite in 16 holes they had drilled.

The detonation sent rocks weighing hundreds of pounds in all directions like so many grains of sand. It wrecked a new boiler at the plant and the boulder bombardment shattered the chimney and windows of the A. C. Titus furniture structure across the street.

James Kelly, Jr., a city employe, died of a fractured skull two hours after at Salem hospital. Other city employes taken to the hospital were Napoleon Theriault of Boston street, dying; David Whitehead, Charles Graves, Thomas Harney and Stanley Bojannicz.

Treated at the scene and then sent home were Robert J. Clegg, Henry Wenburg and Arthur Heffernan. Joseph Lee, a chauffeur for the furniture company who was seated in his truck, was injured when an 85-pound boulder crashed through the windshield.

Some of the men were buried under the debris and those in the boiler room were trapped.

It is believed by official probers after an examination of the rock formation that any of three causes may have caused the blast—an excessive charge of dynamite, the rock may have broken easily because of weak texture or an old charge may have been set off with the major one.—*Boston* (Mass.) *Daily.*

New Texas Sand and Gravel Development

THE Howard Kenyon Dredging Co., of Houston, Tex., has taken a long-time lease on a 400-acre gravel deposit, situated 27 miles north of Spring and about 60 miles north of Houston. It will proceed immediately with the development of the property, and a large amount of modern gravel pit machinery and equipment will be installed, according to Howard Kenyon. He said that in order to give the industry a transportation outlet the company will construct a 5½-mile railroad from an intersection with the International-Great Northern line at Fetzer.

Mr. Kenyon said the gravel is 80% of the deposit and small in size. The gravel bed on the entire 400 acres is 14 to 32 ft. deep. The project will employ in the beginning from 25 to 30 men and will employ more when full operations are begun.

Mr. Kenyon said the Warren Central Railway Co.'s 20-mile railway from Katy to the Hockley salt mines will be in operation within 90 days. He said that considerable grading has been done, and work of laying rails will start soon. Sidings to hold ties, rails and other materials will be built first at Katy, and then work will follow on the main line.

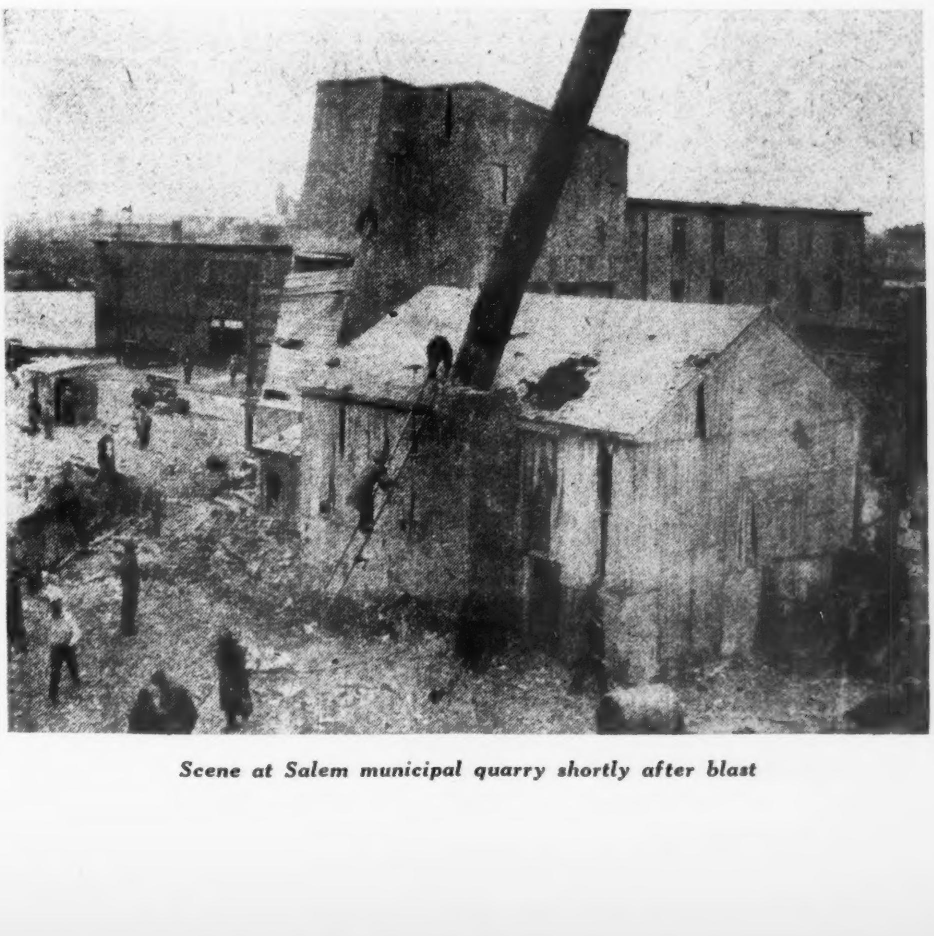
The 20-mile railway will cost about $500,000, Mr. Kenyon said.

Conserving Vision in Industry Subject of Booklet

A VERY interesting and enlightening booklet which can be read with profit by all of our readers is Publication No. 68 of The National Society for the Prevention of Blindness.

The booklet reprints a number of papers presented at the 1929 conference of the Society, namely "Conserving Vision in Industry," by H. D. McBride; "Rehabilitation of Injured Eyes," by Sydney Walker, Jr., M. D.; "Eyes Saved in Industry," by Lewis H. Carris, and "A Trial Industrial Survey," by William F. Hardy, M. D., and A. P. Thursby.

Copies may be obtained by addressing The National Society for the Prevention of Blindness, 370 Seventh avenue, New York City.



Scene at Salem municipal quarry shortly after blast

Foreign Abstracts and Patent Review

X-Ray Examination of Tricalcium Silicate. R. Brill states that in order to clear up the problem of the existence of $3CaO \cdot SiO_2$, a tricalcium silicate prepared by Prof. Jaenecke was examined by means of the x-ray. The preparation was obtained by fusion of calculated quantities of CaO and SiO_2. The product of the fusion was tempered for 3¼ hours at 1500 deg. C., and then cooled rapidly. The x-ray examination resulted in the diagram given in the upper half of the accompanying cut. The lower half of the cut represents a diagram of dicalcium silicate. The two diagrams differ merely in the fact that the latter is somewhat less prominent than the first, and that it shows a little more diffused radiation.

It is hardly possible to draw a conclusion from these diagrams different from this one: That both are identical; for there is a conformity as well in respect to the location of the lines of interference, as in respect to their intensity. From this is concluded that the product designated as tricalcium silicate represents merely a mixture of dicalcium silicate and CaO. (The CaO lines coincide in part with those of the β-dicalcium silicate. But also if these could not be identified, this finding would not be discounted, since first the CaO might have changed in the presence of air, into $CaCO_3$, or secondly, the $CaCO_3$ and CaO might be present, very finely distributed, so that their interferences are not seen due to the fading out of the illustration.) It would be possible also to explain the finding in such a way, that the fusion of the composition $2CaO \cdot SiO_2$ had formed the compound $3CaO \cdot SiO_2$ besides $CaO \cdot SiO_2$, or even free SiO_2. However, this explanation is to be rejected, since the dicalcium silicate is a very clearly defined body. The third possibility, finally, that $2CaO \cdot SiO_2$ and $3CaO \cdot SiO_2$ form like screens, is improbable because then displacements in intensity would have to be expected. For it is hardly thinkable that there be a building up of those comparatively plentiful molecules CaO without noteworthy changes in the density of layer of certain screen sections, for upon each molecule $2CaO \cdot SiO_2$ at least one more CaO is applied. If any conclusion is to be drawn from these x-ray pictures it is this, that the tricalcium silicate cannot exist as an independent compound, but that in the fusion of CaO and SiO_2 in the molecular proportion of 3:1 and subsequent tempering at 1500 deg. C. a mixture of $2CaO \cdot SiO_2$ and CaO is formed.—*Zement* (1930) **19**, 34, p. 796.

"Tricalcium Silicate." R. Brill published under the above title (*Zement*, 1930 No. 34) X-rayograms of tricalcium silicates and bicalcium silicates prepared by Jaenecke. There was such a confusing conformity between the two, that Brill concluded that the tricalcium silicate does not exist as an independent compound, but that it represents merely a mixture of bicalcium silicate and lime.

At this time A. Guttmann and F. Gille state that the preparation of the pure tricalcium silicate is exceedingly difficult or protracted as is apparent from the statements of W. C. Hansen (*Jour. Amer. Ceramic Soc.* Vol. II, 1928, p. 68ff.) and W. Dyckerhoff (*Diss. phil. Frankfurt*, 1925, p. 32ff.). Then the authors describe the first and the second methods of Hansen, and the method of Dyckerhoff.

Now, when Jaenecke first fuses, in preparing his preparations, and then tempers only 3¼ hours at 1500 deg. C., the high probability must be counted upon that in the fusing major quantities of bicalcium silicate and free lime have appeared, which have not changed back into tricalcium silicate during the simple and comparatively brief tempering (without repeated pulverizing). It is therefore not surprising that his supposed tricalcium silicate shows the X-rayogram of bicalcium silicate. By making optical and chemical examination of the preparations X-rayed by him, Brill may convince himself of the correctness of the assumption of the authors.

R. Brill then asks the authors to supply him with a pure test specimen of tricalcium silicate for examination and he states also that in his article on tricalcium silicate (*Zement*, 1930, No. 34) the cut was upside down.—*Zement* (1930) **19**, 39, pp. 914-915.

New German Tentative Cement Specifications. Dr. Haegermann states the changes that had been made occasionally in the German specifications for portland cement, iron portland cement, and blast furnace cement, and then describes the recently proposed changes that were made public on September 18, 1930, as tentative specifications. The quality requirements and the test methods for the various cements are not altered, but the definitions have been changed. Just as before, portland cement must not contain more than 1.7 weight parts of lime per 1 weight part of soluble silicic acid plus alumina plus ferric oxide. A new specification reads that insofar as manganese oxide occurs in noteworthy quantities (above ½%) it is to be figured to the sum of silicic acid plus alumina plus ferric oxide. Another new specification reads that the loss on ignition must not be more than 5% at the time of the delivery of the cement by the cement plant. The content of magnesia (MgO) must not exceed 5%, that of sulphuric anhydride (SO_3) 2.5%, all based upon ignited portland cement. The addition of foreign material may be as much as 3%, as before.

The prepared raw portland cement material must not leave more than 35% residue on the 4900-mesh (metric) screen, based upon material dried at 100 deg. C. Natural cements or mixes of natural cement with substances which serve for adjusting the volume consistency, the period of set, etc., of the cement, must not be designated as natural portland cement. In defining blast furnace cement, the specification for the chemical composition of the blast furnace slag was brought into agreement with the definition for blast furnace cement. Instead of

$$\frac{CaO + MgO}{SiO_2 + Al_2O_3} > 1$$

has been placed

$$\frac{CaO + MgO + \tfrac{1}{3} Al_2O_3}{SiO_2 + \tfrac{2}{3} Al_2O_3} > 1$$

In reference to the standard cements, the maximum admissible residue on the 900-mesh (metric) screen has been changed from 8% to 2%, and the residue on the

Upper half shows results of x-ray examination of tricalcium silicate. Lower half—dicalcium silicate

4900-mesh screen must not be more than 25%. As before, hardening must not begin before one hour after preparation of the specimen. For high grade portland cement, the compressive and tensile strength after 3 days water storage and after 28 days combined storage are considered determinative. For portland cement a test after 7 days gives a preliminary judgment, but the test after 28 days water storage is considered final if the cement is used for marine construction, and after 28 days combined storage if it is used for land construction. Protests to the tentative specifications may be sent in up to November 1, 1930.—*Tonindustrie-Zeitung* (1930) **54**, 77, pp. 1237-1241.

Recent Process Patents

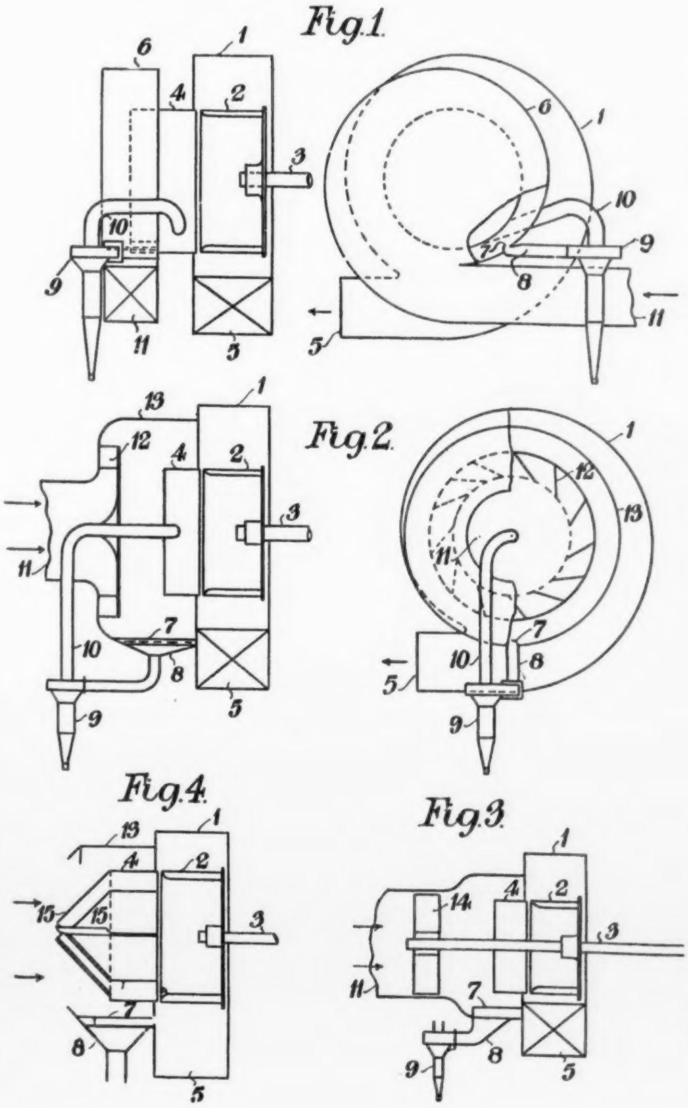
The following brief abstracts are of current process patents issued by the U. S. Patent Office, Washington, D. C. Complete copies may be obtained by sending 10c to the Superintendent of Documents, Government Printing Office, Washington, for each patent desired.

Apparatus for Separating and Collecting Dust. This invention describes apparatus for separating and collecting dust in connection with industrial processes, calcining, heating furnaces, boiler plants and the like, in conjunction with draft or velocity producing devices such as a fan or stack. The dust-laden air or gas is caused to rotate rapidly in a separating chamber where the dust by reason of its greater specific gravity is thrown outward by centrifugal action against the periphery of the separating chamber and directed to a dust collector or settling chamber, the rotation of the gases being accomplished in any one of a number of different ways. In Fig. 1 the dust-laden air enters a volute chamber 6 tangentially at 11 and is given a whirling motion, the dust being thrown outward and caught by the lip 7 and diverted to the dust collector 9. The purified current of air is drawn from the separating chamber 6 through the passage by the fan 2 and exhausted at 5, while the air separated in the small dust collector 9 is returned to the main stream in the passage 4. Modifications of this arrangement are described: with a circular instead of a volute separating chamber and with stationary vanes to impart a whirling motion, or with paddles on the extended fan shaft; with a fan blowing into a volute separating chamber; with a fan blowing into a casing or pipe arranged with helical blades to give the whirling motion; and with the air admitted through tangential openings. *John Whitmore,* Belfast, Ireland, assignor to Davidson & Company, Ltd., Belfast, Ireland. *United States Patent* 1,760,617.

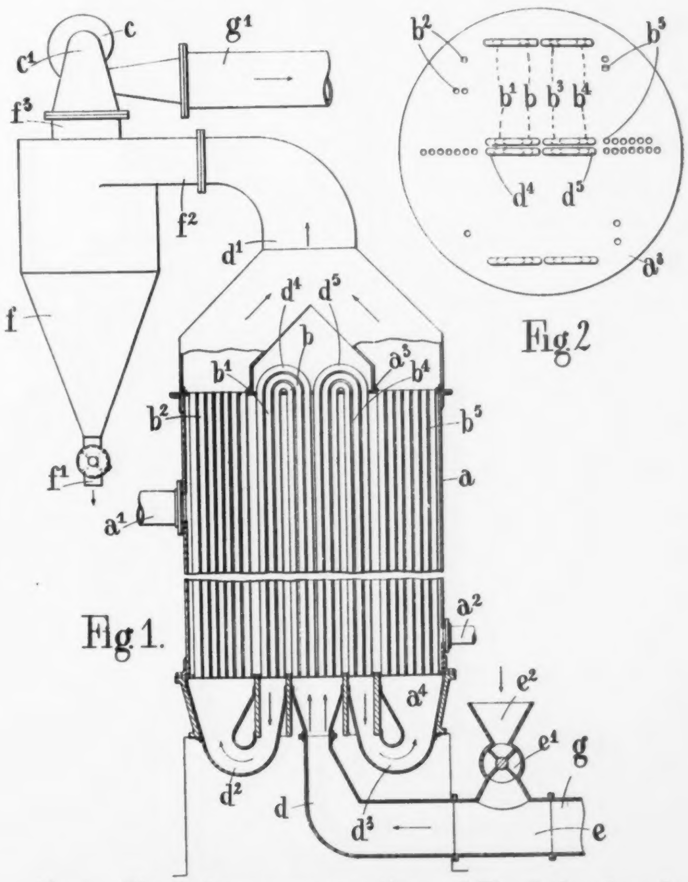
Drying of Moist Pulverized Material. This invention describes a rapid method of drying fine substances such as coal dust, peat, lignite, etc., suspended in a moving current of air or gas and traveling past heated surfaces. Fig. 1 shows a cross-section and Fig. 2 a plan of the apparatus used.

Air is drawn into the system at *e*, and the material to be dried is fed in at *e'*, the mixture passing through a series of tubes as shown so that it is divided among a large number of small passages in order to bring it into close proximity to the heated walls of the tubes. The tubes are heated by hot water or waste steam circulating around them through the chamber *a*.

The mixture of air and dried particles coming from the tubes goes to a cyclone collector *f*, the outlet of which is connected to a fan *c*, which draws the mixture through the tubes and collector and exhausts the moisture-laden air at *g'*.



Left — Details of apparatus for separating and collecting dust



Above—Fig. 1 shows a cross-section and Fig. 2 the plan of the apparatus used for drying fine materials

Rapid drying at low temperatures and with a small amount of heat are claimed. *Olof Soderlund and Thomas Gram,* London, England, assignors to Techno-chemical Laboratories, Ltd., London, England. *United States Patent,* 1,766,843.

Traffic and Transportation

Car Loadings of Sand and Gravel, Stone and Limestone Flux

THE following are the weekly loadings of sand and gravel, crushed stone and limestone flux (by railroad districts) as reported by the Car Service Division, American Railway Association, Washington, D. C.:

CAR LOADINGS OF SAND, GRAVEL, STONE AND LIMESTONE FLUX

District	Limestone Flux Week ended Sept. 20	Limestone Flux Week ended Sept. 27	Sand, Stone and Gravel Week ended Sept. 20	Sand, Stone and Gravel Week ended Sept. 27
Eastern	3,318	3,117	11,658	11,102
Allegheny	2,829	3,045	7,939	7,863
Pocahontas	571	504	1,748	1,877
Southern	519	536	10,245	9,821
Northwestern	1,396	1,184	8,385	7,675
Central Western	543	486	11,640	10,767
Southwestern	516	530	6,922	7,142
Total	9,692	9,402	58,537	56,247

COMPARATIVE TOTAL LOADINGS, BY DISTRICTS, 1929 AND 1930

District	Limestone Flux 1929 Period to date Sept. 28	Limestone Flux 1930 Period to date Sept. 27	Sand, Stone and Gravel 1929 Period to date Sept. 28	Sand, Stone and Gravel 1930 Period to date Sept. 27
Eastern	131,208	112,970	430,438	313,964
Allegheny	140,118	106,844	277,236	247,229
Pocahontas	14,679	17,980	37,634	48,252
Southern	21,484	24,735	344,943	310,423
Northwestern	43,760	37,121	243,704	211,251
Central Western	20,162	18,289	407,344	382,346
Southwestern	19,098	17,508	261,385	251,548
Total	390,509	335,447	2,002,684	1,765,013

COMPARATIVE TOTAL LOADINGS, 1929 AND 1930

	1929	***1930***
Limestone flux	***390,509***	***335,447***
Sand, stone, gravel	***2,002,684***	***1,765,013***

Proposed Changes in Rates

THE following are the latest proposed changes in freight rates up to the week of October 18:

SOUTHERN FREIGHT ASSOCIATION DOCKET

52302. Estimated weight on **crushed stone** between points on the Southern Ry. It is proposed to establish estimated weight of 2800 lb. per cu. yd. on crushed stone for application on the Southern Railway.

52319. **Slag, basic, ground,** less than carloads, between points in North Carolina. It is proposed to establish rates on ground basic slag, less than carloads, between points in North Carolina on basis of the present less than carload fertilizer rates published in Agent Cottrell's I. C. C. 767, North Carolina intrastate tariff.

52332. **Crushed marble or marble chips** from New Orleans, La. (import), to Baton Rouge, La., Jackson, Miss., Meridian, Miss., Birmingham, Montgomery, Ala., and Chattanooga, Tenn. Class 7 rates now apply. Proposed rates on crushed marble or marble chips (See Note 3), from New Orleans, La. (applicable from shipside), to Baton Rouge, La., 115c; Jackson, Miss., 155c; Meridian, Miss., 161c; Birmingham, Ala., 207c; Montgomery, Ala., 190c, and to Chattanooga, Tenn., 247c per net ton. The proposed rates are made on basis of 115% of the I. C. C. 17517 scale.

52373. **Fullers earth,** from Lumpkin, Ga., to New York, N. Y. It is proposed to reduce the present rate on fullers earth, in bags or sacks or in bulk, in box cars (carload minimum weight, 50,000 lb.; in barrels or casks, carload minimum weight, 40,000 lb.), from Lumpkin, Ga., to New York, N. Y., rail and water, from 838c per net ton to 636c per net ton.

52383. **Crushed stone,** from Hitchcock Mills, Va., to Alexanders, Hodges, Joliff and Silverthorn, Va. It is proposed to establish rate of 79c per ton of 2240 lb. on crushed stone, carloads, from Hitchcock Mills, Va., to Alexandria, Hodges, Joliff and Silverthorn, Va. Made in line with rates currently in effect to other destinations in the same vicinity.

SOUTHWESTERN FREIGHT BUREAU DOCKET

21170. **Slag,** from points in the Birmingham, Ala., district to points in the Southwest. To establish rates on slag, not pulverized, carloads (See Note 3), from Birmingham, Ala., district, viz. (Alabama):

Avondale	Milner Junction
Bessemer	Mims
Birmingham	Mineral Springs
Boyles	North Birmingham
Clift	Oxmoor
Connable	Phoenixville
Tarrant	Pratt City
East Birmingham	Ridgeland
East Thomas	Ruffner
Ensley	Simmons
Gate City	Thomas
Grasselli	West End
Irondale	Woodlawn
McAdory	Woodward
Mary Lee, Conn.	Holt

to points in the Southwest as shown in S. W. L. Tariff 162, on basis of the I. C. C. Docket 17,000, part 11, scale. Where distances are computed via Memphis, Tenn., the arbitrary of 6c per 100 lb., provided in Docket 17,000, part 11, will be added. Where distances are computed via Mississippi River crossings south of Memphis, Tenn., 8c per 100 lb. will be added to the scale. Rates so arrived at to be in lieu of rates currently applicable between the same points. Shippers are complaining over the failure, as they state, to secure a reasonable basis for rates on slag from points in the Birmingham district to points in the Southwest, and request that rates be published on the scale and bases outlined above.

Note 1—Minimum weight marked capacity of car.

Note 2—Minimum weight 90% of marked capacity of car.

Note 3—Minimum weight 90% of marked capacity of car, except that when car is loaded to visible capacity the actual weight will apply.

21180. **Lime,** from Texas producing points to interstate points. To establish for northbound application the same rates on lime, carloads, as described in Item 1284, S. W. L. Tariff 2M, and Item 5775, S. W. L. Tariff 1Q, as published on page 131, S. W. L. Tariff 2M, southbound, plus the column differentials as authorized in the items from points in C. F. A., Omaha, Davenport and other territories. It is stated that while as a general rule the Southwestern Lines have not made a practice of using southbound adjustment for a basis northbound, some exceptions have been made to the rules. For example, on cotton blankets the northbound rates were based on the St. Louis rate plus the southbound differential. Doubtless there have been other situations of this kind.

21191. **Sand,** from Guion, Ark., to Denver, Colo. To establish a rate of 34½c per 100 lb. on sand, asbestos, sand, N. O. I. B. N., in western classification; sand pit strippings, carloads, minimum weight as described in Item 9190-B, W. T. L. Tariff 111C. Shippers request the publication of the same rate on sand from Guion, Ark., as is currently applicable from Brownton, Wis., Grays Summit, Klondike, Mo., Davis Jct., Ottawa, Ill., Pacific, Mo., Utica and Wedron, Ill.

21236. **Cement,** from Chicago, Ill., to points in southeast Missouri. To amend Item 650, S. W. L. Tariff 68-L, applying on cement, carloads, from Chicago, Ill., to points in southeast Missouri, by canceling the exception which has the effect of making the item applicable on straight carloads of cement from Chicago and points taking same rates. It is stated that the exception now published in Item 650, S. W. L. Tariff 68-L, creates an improper situation which it is desired to eliminate.

21252. **Talc,** from Cartersville, Ga., to Tulsa, Okla. To establish a rate of 49c per 100 lb. on talc, crude, ground or dust, carloads, minimum weight 36,000 lb., from Cartersville, Ga., to Tulsa, Okla. Producers at Cartersville, Ga., have requested the establishment of an appropriate commodity rate on crude ground talc, carloads, from that point to Tulsa, Okla. The present basis is Cairo combination, viz., 72½c per 100 lb.

21265. **Lime,** from and to points in the Southwest. Amend the following tariffs by increasing the minimum weight on lime to 30,000 lb. where now lower:

Tariff No.	Application
Mo. Pac.—4340H	S.E. Missouri to Illinois
Mo.-Ill.—22D	S.E. Missouri to Missouri
Mo. Pac.—6172E	Missouri intrastate
St. L.-S. F.—3405C	Missouri intrastate
Mo. Pac.—4818F	Missouri intrastate
S. W. L.—68L	St. Louis, etc., to S.E. Mo.
A. F. D. T.—5G	Arkansas intrastate
Boyd's—91F	Missouri intrastate

Also all other tariffs of individual lines and tariffs issued by Agents Boyd and Johanson.

An interested shipper calls attention to Missouri Pacific Tariff 4340H and requests minimum weight be advanced to 30,000 lb. because that minimum is now applicable from competing shipping points. It is not felt that the carriers can reduce the minimum from 30,000 to 24,000 lb.

21275. **Keene's cement,** from Oklahoma and Texas producing points to New York, N. Y. To establish a rate of 32½c per 100 lb. on Keene's cement, carloads, minimum weight 60,000 lb., from Oklahoma and Texas producing points to New York, N. Y. Shippers of Keene's cement call attention to rate of 32½c applying from Medicine Lodge, Kan., to New York piers routing via Gulf ports. Due to higher rates in effect from Oklahoma and Texas producing points, producers in the latter named territory are unable to compete with Medicine Lodge on an equal basis; consequently it is felt that the request is not an unreasonable one.

21290. **Stone,** from Marquette, Mo., to points in Missouri. To establish a rate of 4½c per 100 lb. on stone, carloads, minimum weight 80,000, or marked capacity of car if less, from Marquette, Mo., to Malden, Mo., and necessary intermediate points on the St. L. S. W. Ry. The proposed rate, it is stated, is that currently applicable via the St. L.-S. F. Ry.

CENTRAL FREIGHT ASSOCIATION DOCKET

26399. To establish on **sand and gravel,** carloads (See Note 3), from Dille, O., to Bellaire, O., rate of 50c per ton of 2000 lb. Present rate, 60c per ton of 2000 lb.

26400. To establish on **sand** (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding and silica) and **gravel,** carloads (See Note 3), from Tecumseh, Mich., to Adrian, Mich., rate of 50c per net ton. Present rate, 54c per net ton.

26407. To amend agency and individual lines' tariffs naming rates on **cement,** carloads, from points in Central Freight Association territory to points in the South, by restricting said rates so that they will not apply in connection with shipments routed via Cincinnati O., or Limeville, Ky., C. & O. Ry., Maysville, Ky., thence L. & N. R. R. or its connections.

Sup. 1 to W. D. A. 26004. White Docket Advice No. 26004, Docket Bulletin No. 1833, of August 21, 1930, covering proposal to establish on **lime,** carloads, minimum weight 40,000 lb., from Mitchell, Ind., to Wisconsin Dam, Wis., rate of 21½c is hereby withdrawn from the docket.

26417. To establish on **crushed stone,** carloads (See Note 3), from West Columbus, O., to points in West Virginia, rates as shown below:

To	Prop.	Pres.	To	Prop.	Pres.
C. & O. Ry.			B. & O. Ry.		
So. Malden	170	185	St. Marys	160	370
B. & O. Ry.			West Union	180	190
Cairo	170	190	Parkersburg	160	330
Cameron	170	190	Weston	200	610
Clarksburg	190	190	Sistersville	160	370
Denver	160	190	Magee	150	340
Kenova	170	340	York	150	340
Pennois	180	190	W'mstown	150	340

26427. To establish on **rubble stone,** carloads (See Note 3), from Amherst and McDermott, O., to Lannon, Wis., rates of 16c and 17½c respectively. Present rates, 26½c from Amherst and 29c from McDermott, O.

26428. To establish on **lime, common, hydrated, quick or slaked,** and **lime, agricultural and fluxing,** having no commercial value for chemical or building purposes, carloads, from Huntington

and Keeport, Ind., to Illinois, Iowa, Indiana, Missouri and Wisconsin destinations, rates as illustrated in Exhibit A attached. Route—Via Wabash Ry. and connections as shown in Exhibit A attached. Present rates, classification basis.

EXHIBIT A

Proposed Rates (in cents per 100 lb.)
From Huntington, Ind.

To (representative pts.)	Lime: Common, hydrated, quick or slaked	Lime: Agricultural and fluxing	Route No.
A. T. & S. F.			
Willow Springs, Ill.	13	10.5	1
Plaines, Ill.	14.5	11.5	2
Mazon, Ill.	14.5	11.5	2
Chillicothe, Ill.	14.5	11.5	2
Edelstein, Ill.	17	13.5	2
Surrey, Ill.	17.5	14	2
Long Point, Ill.	14.5	11.5	2
Pekin, Ill.	14.5	11.5	2
C. & A.			
Joliet, Ill.	13	10.5	1
Millsdale, Ill.	14.5	11.5	1
Mazonia, Ill.	14.5	11.5	1
Blackstone, Ill.	14.5	11.5	1
Evans, Ill.	14.5	11.5	1
Cazenovia, Ill.	14.5	11.5	1
South Pekin, Ill.	14.5	11.5	3
Middletown, Ill.	14.5	12.5	3
Odell, Ill.	14.5	11.5	3
Bloomington, Ill.	14.5	11.5	3
Atlanta, Ill.	14.5	11.5	3
Elkhart, Ill.	15.5	12.5	3
Rees, Ill.	17	13.5	3
Auburn, Ill.	16	13	3
Reeders, Ill.	17	13.5	3
Federal, Ill.	17	13.5	3
Delavan, Ill.	14.5	11.5	3
Petersburg, Ill.	16	13	4
Whitehall, Ill.	17	13.5	4
Louisiana, Mo.	17	13.5	4
C. & E. I.			
Freeland Park, Ind.	12	9.5	5
Joppa, Ill.	18	14.5	6
Thebes, Ill.	18	14.5	6
C. & N. W.			
Barrington, Ill.	14	11	1
Elgin, Ill.	13.5	11	1
Freeport, Ill.	17.5	14	1
St. Charles, Ill.	13.5	11	1
Clinton, Ia.	17.5	14	1
C. G. W.			
Lombard, Ill.	13.5	11	1
Lily Lake, Ill.	14	11	1
De Kalb, Ill.	14	11	1
Stillman Valley, Ill.	17.5	14	1
Winston, Ill.	17.5	14	1
Dubuque, Ia.	17.5	14	1
C. M. St. P. & P.			
Cheneyville, Ill.	12.5	10	7
Aurora, Ill.	13.5	11	8
De Pue, Ill.	14.5	11.5	1
Rock Island, Ill.	17.5	14	1
C. R. I. & P.			
Utica, Ill.	14.5	11.5	1
Marquette, Ill.	14.5	11.5	1
Peoria, Ill.	14.5	11.5	1
Atkinson, Ill.	17.5	14	1
M. St.P. & S. S. M.			
Fehanville, Ill.	13.5	11	1
Grays Lake, Ill.	14.5	11.5	1
Trevor, Wis.	14.5	11.5	1
Siding No. 74, Wis.	15	12	1
Milwaukee, Wis.	15	12	1
M.-I.			
Salem, Ill.	16.5	13	10
Centralia, Ill.	16.5	13	9
Sparta, Ill.	18	14.5	9, 10
Evansville, Ill.	18	14.5	9, 10
Chester, Ill.	18	14.5	9, 10
Mo. Pac.			
Valmeyer, Ill.	18	14.5	11
Flinton, Ill.	18	14.5	11
La Rue, Ill.	18	14.5	11
Murphysboro, Ill.	18	14.5	11
Clifford, Ill.	18	14.5	11
Mt. Vernon, Ill.	17	13.5	12
Percy, Ill.	18	14.5	13
M. & O.			
Lemens, Ill.	18	14.5	11
Sparta, Ill.	18	14.5	11
Murphysboro, Ill.	18	14.5	11
Cairo, Ill.	18	14.5	11
N. Y. C.			
Sheff, Ill.	12	9.5	5
Delmar, Ill.	13	10.5	14
Dwight, Ill.	14.5	11.5	14
R. I. S.			
Galesburg, Ill.	17	13.5	15
Monmouth, Ill.	17.5	14	15
Gilchrist, Ill.	17.5	14	15
Raynolds, Ill.	17.5	14	15
R. T. & N.			
Toluca, Ill.	14.5	11.5	16
Magnolia, Ill.	14.5	11.5	16
Southern			
Marengo, Ill.	15.5	12.5	17, 18
Huntingburg, Ind.	16	13	18, 19
Winslow, Ind.	16	13	18, 19
Mt. Carmel, Ill.	15.5	12.5	18, 19
Albion, Ill.	16.5	13	18, 19
Mt. Vernon, Ill.	17	13.5	11
Centralia, Ill.	16.5	13	11
Belleville, Ill.	17	13.5	11
Evansville, Ind.	16	13	18, 19
French Lick Spgs., Ind.	15.5	12.5	18

From Keeport, Ind.

To (representative pts.)	Lime: Common, hydrated, quick or slaked	Lime: Agricultural and fluxing	Route No.
A. T. & S. F.			
Willow Springs, Ill.	13	10.5	1
Plaines, Ill.	13	10.5	2
Mazon, Ill.	14	11	2
Chillicothe, Ill.	14	11	2
Edelstein, Ill.	17	13.5	2
Surrey, Ill.	17	13.5	2
Long Point, Ill.	14	11	2
Pekin, Ill.	14	11	2
C. & A.			
Joliet, Ill.	13	10.5	1
Millsdale, Ill.	13	10.5	1
Mazonia, Ill.	14	11	1
Blackstone, Ill.	14	11	1
Evans, Ill.	14	11	1
Cazenovia, Ill.	14	11	1
South Pekin, Ill.	14	11	3
Middletown, Ill.	14.5	11.5	3
Odell, Ill.	14.5	11.5	3
Bloomington, Ill.	14.5	11.5	3
Atlanta, Ill.	14	11	3
Elkhart, Ill.	14.5	11.5	3
Rees, Ill.	16.5	13	3
Auburn, Ill.	15.5	12.5	3
Reeders, Ill.	16.5	13	3
Federal, Ill.	16.5	13	3
Delavan, Ill.	14	11	3
Petersburg, Ill.	15	12	4
Whitehall, Ill.	16.5	13	4
Louisiana, Mo.	17	13.5	4
C. & E. I.			
Freeland Park, Ind.	11.5	9	5
Joppa, Ill.	17.5	14	6
Thebes, Ill.	17.5	14	6
C. & N. W.			
Barrington, Ill.	14	11	1
Elgin, Ill.	13.5	11	1
Freeport, Ill.	17	13.5	1
St. Charles, Ill.	13.5	11	1
Clinton, Ia.	17	13.5	1
C. G. W.			
Lombard, Ill.	13	10.5	1
Lily Lake, Ill.	14	11	1
De Kalb, Ill.	14	11	1
Stillman Valley, Ill.	17	13.5	1
Winston, Ill.	17	13.5	1
Dubuque, Ia.	17	13.5	1
C. M. St. P. & P.			
Cheneyville, Ill.	11.5	9	7
Aurora, Ill.	13.5	11	8
De Pue, Ill.	14	11	1
Rock Island, Ill.	17	13.5	1
C. R. I. & P.			
Utica, Ill.	14	11	1
Marquette, Ill.	14	11	1
Peoria, Ill.	14	11	1
Atkinson, Ill.	17	13.5	1
M. St.P. & S. S. M.			
Fehanville, Ill.	13	10.5	1
Grays Lake, Ill.	14	11	1
Trevor, Wis.	14	11	1
Siding No. 74, Wis.	14.5	11.5	1
Milwaukee, Wis.	14.5	11.5	1
M.-I.			
Salem, Ill.	15.5	12.5	10
Centralia, Ill.	15.5	12.5	9
Sparta, Ill.	17.5	14	9, 10
Evansville, Ill.	17.5	14	9, 10
Chester, Ill.	17.5	14	9, 10
Mo. Pac.			
Valmeyer, Ill.	17.5	14	11
Flinton, Ill.	17.5	14	11
La Rue, Ill.	17.5	14	11
Murphysboro, Ill.	17.5	14	11
Clifford, Ill.	17.5	14	11
Mt. Vernon, Ill.	16	13	12
Percy, Ill.	17.5	14	13
M. & O.			
Lemens, Ill.	17.5	14	11
Sparta, Ill.	17.5	14	11
Murphysboro, Ill.	17.5	14	11
Cairo, Ill.	17.5	14	11
N. Y. C.			
Sheff, Ind.	12	9.5	5
Delmar, Ill.	12.5	10	14
Dwight, Ill.	14	11	14
R. I. S.			
Galesburg, Ill.	17	13.5	15
Monmouth, Ill.	17	13.5	15
Gilchrist, Ill.	17	13.5	15
Raynolds, Ill.	17	13.5	15
R. T. & N.			
Toluca, Ill.	14	11	16
Magnolia, Ill.	14	11	16
Southern			
Marengo, Ind.	15	12	17, 18
Huntingburg, Ind.	15.5	12.5	18, 19
Winslow, Ind.	15	12	18, 19
Mt. Carmel, Ill.	15	12	18, 19
Albion, Ill.	15.5	12.5	18, 19
Mt. Vernon, Ill.	16	13	11
Centralia, Ill.	15.5	12.5	11
Belleville, Ill.	16.5	13	11
Evansville, Ind.	15.5	12.5	18, 19
French Lick Spgs., Ind.	14.5	11.5	18

Explanation of Route Numbers

Route No.	Route via
1.	Chicago, Ill.
2.	Streator, Ill.
3.	Springfield, Ill.
4.	Jacksonville, Ill.
5.	Danville, Ill.
6.	Altamont, Ill.
7.	Newell, Ill.
8.	Manhattan, Ill.
9.	Altamont, Ill., B. & O. R. R., and Salem, Ill.
10.	Litchfield, Ill., C. B. & Q. R. R., and Centralia, Ill.
11.	East St. Louis, Ill.
12.	East St. Louis, Ill., M. & O. R. R., and Percy, Ill.
13.	Altamont, Ill., C. & E. I. Ry., and Mt. Vernon, Ill.
14.	North Liberty, Ind. (from Huntington, Ind., only); Danville, Ill. (from Keeport, Ind., only).
15.	Chicago, Ill., A. T. & S. F. Ry., and Galesburg, Ill.
16.	Chicago, Ill., C. & A. R. R., and Custer, Ill.
17.	Lafayette, Ind., C. I. & L. Ry., and New Albany, Ind.
18.	Logansport, Ind., P. R. R., and New Albany, Ind.
19.	Lafayette, Ind., C. I. & L. Ry., and French Lick Springs, Ind.

26429. To establish on **sand and gravel**, carloads (See Note 3), from Troy, O., to Delta, O., rate of $1.25 per net ton. Present—Classification basis, sixth class, viz., 17c per C. F. A. L. Tariff 231-A.

26437. To establish on **dolomite**, burned or roasted, carloads (See Note 3):

From	To Lorain, O. Pres.	Prop.
Woodville, O.	170	105
Gibsonburg, O.	170	105
Maple Grove, O.	160	105

From	To Lima, O. Pres.	Prop.
Woodville, O.	170	144
Gibsonburg, O.	170	144
Maple Grove, O.	160	144

26439. To establish on **sand and gravel**, except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silica, carloads (See Note 3):

	From Burr Oak, Ind. Prop. rate
To C. S. S. & S. B. stations (Via Michigan City, Ind.)	
Hammond, Ind.	110
Gary, Ind.	105
Wilhelm, Ind.	95
New Carlisle, Ind.	100
To C. C. C. & St. L. stations (Via Claypool, Ind.)	
Silver Lake, Ind.	80
North Manchester, Ind.	85

Present rate, sixth class.

26440 To establish on **lime**, carloads, rates as shown below:

From	Present	To Henderson, Ky. Minimum weight 30,000 (Proposed)	50,000 (Proposed)
Mitchell, Ind.	13	12	9.5
Milltown, Ind.	13	240*	200*

From	Present	To Owensboro, Ky. Minimum weight 30,000 (Proposed)	50,000 (Proposed)
Mitchell, Ind.	15.5	13	10.5
Milltown, Ind.	14	260*	208*

*Per net ton.

26441. To amend agency and individual lines' tariffs naming rates on **cement**, carloads, between points in Central Freight Association territory and from points in aforesaid territory to points in Trunk Line, New England, Southern, Southwestern, Illinois Freight, Western Trunk Line, and Transcontinental territories, by canceling therefrom the application of C. F. A. L. Combination Tariff 228, I. C. C. U. S. 1, in connection with such rates.

26442. To establish on **raw or crude dolomite** and fluxing stone, carloads (See Note 3), from Carey and McVitty's, O., to Streator, Ill., rate of $2.65 per gross ton. (Proposed for application via C. C. C. & St. L. Ry. in connection with the N. Y. C. R. R.) Present rate, in connection with N. Y. C. R. R., is on classication basis (sixth class), viz., 24c; when in connection with A. T. & S. F. Ry. as delivery line, present rate is $2.65 per gross ton.

26446. To establish on **sand**, N. O. I. B. N., in packages or in bulk (See Note 2), but not less than 60,000 lb., from Stamford, Ont., to Dunkirk, N. Y., rate of $1.40 per net ton. Route: Canadian National Ry., Black Rock, N. Y., and New York Central R. R.

26447. To establish on **crushed stone**, carloads (See Note 1), except when car is loaded to full cubical or visible capacity actual weight will apply, from Melvin, O., to Circleville and Atlanta, O., rates of 80c and 70c per net ton, respectively. Present rates, 90c and 80c per net ton, respectively, per B. & O. R. R. Tariff H3336C.

26449. To establish on **agricultural limestone**, in box cars, carloads, minimum weight 50,000 lb., from Gibsonburg and Woodville

Destination	Delivery	Pres.	Prop.
Hartsdale, Ind.	N. Y. C.	240	230
Hartsdale, Ind.	P. R. R.	240	230
Calumet, Ind.	P. R. R.	260	230
Alco, Ind.	N. Y. C.	260	230
Scott, Ind.	N. Y. C.	260	230
Dixie, Ind.	N. Y. C.	260	230
Olivers, Ind.	N. Y. C.	230	200
Vistula, Ind.	N. Y. C.	220	200
Twin Lake, Ind.	N. Y. C.	220* 200†	190
Ray, Ind.	N. Y. C.	200* 190†	190
Academie, Ind.	N. Y. C.	200	190
Kingsland, Ind.	C. & E.	200	190
Kingsland, Ind.	N.Y.C. & St.L.	200	190
Laketon, Ind.	C. & E.	220	200
Laketon, Ind.	P. R. R.	220	200
Ackerman, Ind.	P. M.	260‡ 197§	230‡ 197§

*From Gibsonburg. †From Woodville.
‡Minimum weight 50,000 lb.
§Minimum weight 80,000 lb.

26451. To establish on **agricultural limestone**, not ground or pulverized, in open-top cars; **crushed stone**, in bulk, in open-top cars, and **stone screenings**, in bulk, in open-top cars, straight or mixed carloads (See Note 3), from Middleport, O., to Woodburn, Ind., rate of 90c per net ton. Route: P. R. R., Ft. Wayne, Ind., Wabash Ry. Present rate, 13c.

26461. To establish on **sand and gravel**, carloads (See Note 3), from Lafayette, Ind., to Thorntown, Ind., rate of 65c per net ton. Present rate, 70c per net ton.

26468. To establish on **silica sand**, carloads (See Note 3), from Browntown, Wis., to C. F. A. territory, rate 16c per ton less than present rates from Muscatine, Ia. Proposed rates in cents per net ton to representative points:

To	Rate
Anderson, Ind.	261
Blairsville, Penn.	415
Bryan, O.	312
Cayuga, Ind.	236
Cleveland, O.	337
East Liverpool, O.	375
Gosport, Ind.	261
Huntington, W. Va.	375
Ketchums, Ind.	261
Logansport, Ind.	236
Marion, O.	312
Muncie, Ind.	261
Peoria, O.	312
Portsmouth, O.	375
Seymour, Ind.	312
Terre Haute, Ind.	236
Washington C. H., O.	362
Youngstown, O.	362

Present rates, combination of locals.

TRUNK LINE ASSOCIATION DOCKET

M-1533. To revise the rates on **cement**, from Alsen, Binnewater, N. Y., Lehigh district, Hudson, Howes Cave, Glens Falls, N. Y., Swedeland, West Conshohocken, York, Penn., Hagerstown, Security and Union Bridge, Md., to stations on the Hudson and Harlem division of the N. Y. C. R. R. Statement of rates will be furnished upon request.

M-1534. **Sand and gravel**, carloads (See Note 2), from Pinewald, Quail Run and Toms River, N. J., to Brills, Newark, N. J., 80c, and Elizabeth, Bayway, Grasselli, Tremley Point, Warners, Carteret, Tremley, West Carteret, Ft. Reading Crossing, Sewaren, Maurer, Keysbeys, Perth Amboy and Elizabethport, N. J., 70c per net ton.

M-1535. **Gravel and sand**, N. O. I. B. N., in open cars, except blast, engine, foundry, glass, molding, quartz, silex and silica, carloads (See Note 2).

From Morristown, N. J.

To—	Prop. rate	Pres. rate
Short Hills, N. J.	65	69
Millburn, N. J.	65	69
South Orange, N. J.	65	69
Orange, N. J.	65	69
Kenilworth, N. J.	70	*
Newark Heights, N. J.	70	*

From Netcong and Succasunna, N. J.

To—	Prop. rate	Pres. rate
Short Hills, N. J.	69	69
Millburn, N. J.	69	69
South Orange, N. J.	75	81
Orange, N. J.	75	81
Kenilworth, N. J.	80	*
Newark Heights, N. J.	80	*

*Sixth class rate. Rates in cents per net ton.

24833. Cancel D. L. & W. R. R. tariff covering rates on **sand and gravel**, from Mt. Bethel, Penn., and Portland, Penn., also rate on **natural stone and crushed stone**, from Nazareth, Penn., to stations on the R. V. Co. Classification basis to apply. Reason—Investigation develops that no traffic has moved for some time, nor is there prospects for future shipments, therefore rates are obsolete.

24841. **Sand**, other than blast, engine, foundry, molding, glass, silica, quartz or silex **and/or gravel**, carloads (See Note 2), from Carpenterville, N. J., to Lehigh Gap, Penn., $1.05 per net ton. (Present rate, $1.40 per net ton.) Reason—Proposed rate is comparable with rate to Slatington, Danielsville and Andreas, Penn.

24844. **Sand and gravel**, carloads (See Note 2), from Pinewald, Toms River and Quail Run, N. J., to Perth Amboy, N. J., $1.25 per net ton. Reason—Proposed rate is comparable with rate from Millville, N. J.

24858. **Glass sand**, carloads (See Note 2), from Tatesville, Penn.

To—	Prop. rate
Glenshaw, Penn.	$1.95 per net ton
Wellsboro, Penn.	2.75 per net ton
Lockport, N. Y.	2.75 per net ton
Niagara Falls, N. Y.	2.75 per net ton
Clarion, Penn.	2.10 per net ton

Reason—Proposed rates are comparable with rates to Belle Vernon, Kane, Buffalo, N. Y., etc.

24864. **Limestone, ground or pulverized, and limestone dust**, carloads, minimum weight 50,000 lb., from Blakeslee, N. Y., to points on the L. V. R., Wilkes-Barre, Pittston, Tunkhannock, Montrose, Skinners Eddy, Wysox, Athens and various. Rates ranging from $1.40 to $1.80 per net ton. Reason—Proposed rates are fairly comparable with rates from Bellefonte, Penn., and Lime Crest, N. J., to same points.

24867. **Sand, blast, engine, fire, foundry, glass, molding, silica**, carloads (See Note 2), from Santa Clara, N. Y., to Montreal (Place Viger), P. Q., $2.50 per net ton. Present rate—Combination. Reason—Proposed rate is comparable with rates from Santa Clara, N. Y., to Rochester, Oswego and Syracuse, N. Y.

M-1539. **Crushed stone**, carloads (See Note 2), from Bethlehem, Penn., to Haucks, Penn., $1 per net ton. Present rate, $1.25 per net ton. Reason—Proposed rate is comparable with rate from White Haven, Penn.

24868. **Sand and gravel**, carloads (See Note 2), from Alfred, N. Y., to Rock Glen, N. Y., 90c per net ton. Present rate, $1.10 per net ton. Reason—Proposed rate is comparable with rates on like commodities for like distances and conditions.

24870. **Rough quarried granite**, carloads, minimum weight 50,000 lb., from Woodstock, Md., to Alexandria, Va., 9c per 100 lb. Present rate, $2.27 per net ton. Reason—To meet motor truck competition.

24877. **Cement**, carloads, to stations on the Pennsylvania R. R., Willow Grove to Kiptopeke, Va., from Binnewater, 19½c, and from Brixment, 24c per 100 lb. Reason—Proposed rates are comparable with rates from Lehigh district.

24878. To establish switching charge of $6.30 per car covering movement of **crushed stone**, carloads, from Carbon Branch Quarries, Northampton, Penn., to Northampton, Penn. Reason—To meet motor truck competition.

24887. **Lime, land and chemical**, carloads, minimum weight 30,000 lb., from Lebanon Valley district, Myerstown, Annville, Palmyra, Swatara, Penn., and Chester Valley district, Shainline, Howellville, Cedar Hollow, Mill Lane and Exton, Penn., to Martins Creek, Penn., 10c per 100 lb. Present rate, 22½c per 100 lb. Reason—Proposed rate is comparable with rates on like commodities for like distances, services and conditions.

24891. **Slag, crude or crushed**, carloads (See Note 2) to Pennsylvania points (rates in cents per 2000 lb.):

	From			
	Pottstown, Penn.		Birdsboro, Penn.	
To	Prop.	Pres.	Prop.	Pres.
Foxcroft	......	......	105	125
Newton Square	105	125	......	......
Toughkenamon	......	......	105	115
Kelton	105	115	105	115
Nottingham	105	115	......	......

Reason—Proposed rates are comparable with rates on like commodities from and to points in the same general territory.

24897. To revise footnote A, as shown on page 77 of Agent Curlett's I. C. C. A265, permitting the application of rates on **quartz, silica and silex sand** to apply to destinations on the Canadian National Rys. on Toronto, Hamilton & Buffalo Ry., when originating at P. R. R. shipping points, also to revise footnote B, as shown on page 75 of same tariff, to permit the application of rates on **glass sand** to apply to Canadian destination when originating at P. R. R. shipping points. Reason—Account restriction was result of clerical error and it is desired to correct same.

24779, Sup. 1. **Sand**, N. O. I. B. N., in open cars, carloads (See Note 2), from Bellmawr, Downer, Clementon to Hammonton, N. J., inclusive, to Buckingham Junction, Que., 33½c per 100 lb.

24900. **Limestone, crushed, ground or pulverized**, carloads, minimum weight 60,000 lb., from Rocky Point, Va., to Hugheston, W. Va., $2.39 per net ton. Reason—Proposed rate is comparable with rate from Barber, Va.

24902. **Fluxing limestone**, carloads (See Note 2), from Annville, Myerstown, Palmyra and Swatara, Penn., to New Brunswick, N. J., $2.27 per gross ton. Present rate, 22½c per 100 lb. Reason—Rate is comparable with rate from Thomasville, Penn., to Newark, N. J., and Bittinger, Penn., to Roebling and Newark, N. J.

24903. **Sand**, other than blast, engine, molding, foundry, glass, silica, quartz or silex, carloads (See Note 2), from York, Penn., to Walkersville, Md., 90c per net ton. Present rate, $1.40 per net ton. Reason—Proposed rate is comparable with rate from Patapsco, Md., to Havre de Grace, Md., and from Baltimore, Md., to Rowlandville and Frederick, Md.

24904. **Crushed stone**, carloads (See Note 2), from White Haven, Penn., to Port Jervis, N. Y., $1.60 per net ton. Present rate, $1.75 per net ton. Reason—Proposed rate is comparable with rate from White Haven, Penn., to Hickory Grove and Starrucca, Penn.

24942. **Sand and gravel**, other than blast, engine, foundry, glass, molding or silica, carloads, and **crushed stone**, carloads (See Note 2), from Susquehanna, Penn., to Deposit, N. Y., 70c per net ton. Present rate, 85c per net ton. Reason—Proposed rate is comparable with rates from Susquehanna to Thompson, Penn., and Binghamton, N. Y.

NEW ENGLAND FREIGHT ASSOCIATION DOCKET

20900. To cancel present carload commodity rate on **sand, common** (not molding, fire, filter or blasting sand); **sand and gravel** (run of the bank or screened); **stone, crushed (trap rock)**, taking "Group A" rates, also on amiesite or stone, crushed, coated with oil, tar or asphalt, in bulk, in gondola or other open-top cars **taking "Group B"** rates as published in B. & A. R. R. I. C. C. 9089, Item 202, from North Wilbraham and Westerfield, Mass., to Newfane, Vt. Reason—To cancel obsolete commodity rate.

WESTERN TRUNK LINE DOCKET

3072-A. **Stone, broken, crushed or ground** (See Note 2), but not less than 40,000 lb., from various Michigan points to lower Missouri river crossings. Rates, present, as per Items 4257, 4258 and 4274 of W. T. L. Tariff 1-R. Proposed, no change proposed in Item 4257 of W. T. L. Tariff 1-R; in Item 4258 of W. T. L. Tariff 1-R advance the present rate from $3.87 per net ton to $3.90 per net ton; in Item 4274 place reference mark circle 2 opposite the present rate of 29½c to Kansas City and St. Joseph, Mo., the explanation of same to read: "Rates on stone, broken, crushed or ground or broken marble will be 19½c per 100 lb.

ILLINOIS FREIGHT ASSOCIATION DOCKET

5894. **Sand and gravel**, carloads (See Note 3), from East St. Louis, Ill., to Donnellson, Ill. Present rate, 97c; proposed, 63c.

5902. To establish rates on **road gravel**, carloads, on basis of 80% of current gravel rates for application between points in I. R. C. territory.

Protest Sand Rates

A COMPLAINT against railroad rates on sand shipments from the Youngstown, Ohio, district to Illinois, Indiana, Wisconsin and other midwestern states was filed with the Interstate Commerce Commission recently by the Industrial Silica Corp. of Youngstown, Ohio.

The silica concern, which ships a great deal of industrial sand, refers specifically to charges made by the Akron and Barberton Belt railroad as "unjust and unreasonable."—*Youngstown* (Ohio) *Vindicator.*

Erratum

IN ROCK PRODUCTS issue of September 27 it was reported that J. W. Williams represented four silica producers of southern Illinois at the recent Washington freight rate investigation of industrial sands, namely the American Minerals Corp. at Murphysboro, International Silica Co. at Elco, Olive Branch Mineral Products Co. at Cox and the Tamms Silica Co. at Tamms.

We are informed that Mr. Williams' correct name is Ray Williams, and that the Tamms Silica Co. was not represented by him at this meeting.

George Moritz

GEORGE A. MORITZ, district superintendent in charge of the Ormrod, West Coplay and Fogelsville plants of the Lehigh Portland Cement Co., passed away at Allentown on October 16. Mr. Moritz had been well until recently, but a few days prior to his death was stricken with heart trouble and taken to the Allentown hospital.

Mr. Moritz was a native of the Lehigh Valley, having been born at Hokendauqua, Penn., in 1870. He served a blacksmith apprenticeship in his home town and entered the employ of the Lehigh Portland Cement Co. January 16, 1899, as blacksmith and repairman at mill "A." Since that time he remained continually in the employ of the Lehigh company.

George A. Moritz

He served successively as repair foreman, superintendent and district superintendent. He arose rapidly to the position of general mill foreman at Mill D, Ormrod, and when Mill F, also at Ormrod, was completed he was placed in charge. In 1906 he became superintendent at Fogelsville and in 1916 he was given general charge of the mills at Ormrod, Fogelsville and West Coplay. Known as one of the leaders in the safety movement in the Lehigh organization, Mr. Moritz was very proud of the record of all four mills operated under his supervision, all of them having been awarded the Portland Cement Association trophy during the last two years.

Mr. Moritz made a unique place for himself in the Lehigh organization. Every employe who knew him had the kindest feelings and greatest respect for him. By the company he was always considered one of the most faithful and loyal employes. Perhaps few men connected with the cement industry in the Lehigh Valley were as well known as Mr. Moritz and few had as complete a knowledge of operating conditions.

He is survived by a wife and four children. The oldest son, Raymond, has an enviable reputation with Lehigh and has been superintendent of the Fogelsville plant since 1916.

New British Columbia Gravel Plant Completed

AT A COST of over $100,000, Gilley Bros., Ltd., of New Westminster, B. C., have transformed the barren slope of Mary Hill, at the mouth of the Pitt river, into one of the most modern and elaborate sand and gravel plants on the Canadian Pacific coast.

Hydraulic mining monitors, clamshell derricks, thousands of feet of belt conveyors, a screen and crusher house, two washing plants and six huge bins on the hillside, together with a loading wharf and a shuttle type belt conveyor, comprise equipment that is practically automatic in operation and capable of producing over 1000 cu. yd. of gravel a day.

Gravel was taken from the hillside some years ago but a good test was not made until Gilley Bros. dug the deposit for material for the Columbia street fill. Satisfied with the possibilities of the gravel and sand on the site, the firm leased 140 acres on the waterfront and this spring proceeded to install the plant.

Hydraulic jets wash down the material. The water flow takes the material to a sump at one end of the plant. A clamshell lifts the mixture into the first screening bin. The proper sized gravel and the sand are taken off and automatically transferred via a 600-ft. belt 24 in. wide to the final washing and screening plants at the top of the hill. The boulders go to a large rock crusher to be reduced in size before entering the screens.

The washing and screening plants divide the material into two gradations of sand and four sizes of rock. Funnels underneath directly overhang the six huge bins bulkheaded on the hillside. These bins are 100 ft. long and 40 ft. wide with a steep slope that allows the material to gravitate to the bottom end.

At the bottom of the bins a tunnel 9 ft. square and 300 ft. long has been built underground with traps from the bins. A conveyor belt, 600 ft. long and 36 in. wide can take any grade required to the loading machine.

This loading belt is built in the form of a traveling or shuttle crane, traversing the entire wharf and arranged to discharge on any part of the gravel scows moored alongside. When not in use the shuttle is kept inshore and clear of the edge of the wharf. The shuttle belt is 220 ft. long and 36 in. wide.

The shuttle conveyor is one of the most effective methods for spreading the material evenly over the scow and is believed to be the first constructed on this coast. The loading process is rapid and continuous and it is possible to load a large scow in less than one hour. A tug delivers the scow to New Westminster in half an hour.

The wharf is 200 ft. long and 20 ft. wide. It is heavily reinforced with logs, piles and beams and is considered one of the best designed and constructed of its type on the Fraser river.

Construction of the modern gravel plant has for some time been one of the projects of Emerson Gilley. Plans were completed and work was started last March in erecting the extensive facilities. The plant was ready to operate in July. One monitor is now washing down the gravel but another will be added soon.

Local engineering talent and local materials were used extensively in constructing the plant. The lumber and logs were from Valley mills. The screens were made by Weir & Taylor; the Heaps Engineering Co. manufactured the conveyor machinery. The speed gears were made by the Sumner Iron Works. Electric work was done by Hume & Rumble. The Fraser River Pile Driving Co. built the wharf. The electric motors were brought from eastern Canada.

Associated with Mr. Gilley in the project were A. C. R. Yuill, consulting engineer; H. C. H. Verrall, resident engineer, and Capt. J. G. Knight, superintendent.

Marble Cliff Quarries Co. Rebuilds Plant; and Builds Good Will

BELIEVING that business conditions will steadily be on the upgrade during the coming year, the Marble Cliff Quarries Co., Columbus, Ohio, is engaged in the expenditure of thousands of dollars in the remodeling of its big stone plant, known as Plant X, at its quarries on Scioto River road.

This plant has a daily production of 4000 tons of stone, most of which goes to blast furnaces, chemical works, and for the production of soda ash. From this plant also stone is produced to be used in the burning of lime in rotary kilns at Marble Cliff.

Due to a lessened demand of steel and chemical companies, the Marble Cliff Quarries Co. has taken advantage of a temporary lull to rebuild the main section of this plant in anticipation of an increased demand. The money being expended is mostly for labor.

Prior to the rebuilding of Plant X, the track arrangement for the crusher was so rearranged as to provide for stone being dumped on each side of the crusher where it could be fed from the tracks of the third rail system, or from the quarries by steam locomotives.

There is an ever increasing demand for Marble Cliff stone in all of the trades where such material is used, because of the fact that the local concern is ever making improvements which make its products desirable.—*Columbus* (Ohio) *Citizen.*

Pertinent Paragraphs

¶

Interesting items from everywhere condensed and "abstracted" for the benefit of busy readers

By Hugh Sharp

FRED T. GUCKER, head of the John T. Dyer Quarry Co., sends us a four-page folder prepared for the purpose of boosting the sale of the company's sand-size trap rock. Did you ever see anything quite like it? Certainly anybody who has studied engineering and calculus is going to get a real kick out of it. To relieve the suspense, turning the page reveals $2 + 2 = 4$, the first 2 being quality and the other, service, making the simple equation 4 representing the reasons why the recipient of the piece of literature should buy Dyer products.

~ ~ ~

ABROAD SCIENTIFIC study of brick-laying is being conducted by the Mellon Institute of Industrial Research in co-operation with the Eastern Face Brick Manufacturers Association. Some of the factors to come under the scrutiny of the Mellon staff will be characteristics of various brick, materials, properties of mortars, variations of workmanship, nature of backing, weather problems, elasticity—in fact, every combination of variables representing the probable range of practical application.

~ ~ ~

NOW COMES a professor from the University of Wisconsin who says limestone, or what eventually will be limestone is manufactured in 1000-ton lots in shallow lakes in the Middle West by chara, a water weed that grows freely in those waters. It seems incredible but the eminent biologist avers that one plant returns something like 1000 tons of calcium carbonate to the bottom of the lake annually.

~ ~ ~

A BLOCK OF granite weighing 75 tons in the rough is being quarried at Concord, Vt. It is for the new administration building of the Gulf Refining Co. in Pittsburgh. This is the largest single block taken out in the history of the granite industry according to *The Ledger* of Quincy, Mass.

~ ~ ~

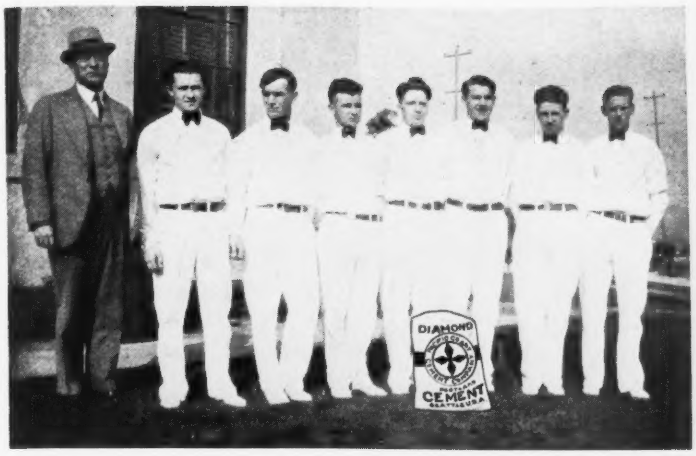
THE READY-MIXED Concrete Co., Knoxville, Tenn., has received a $200,000 contract for a $1,000,000 local bridge project. *Manufacturers Record* says this is the largest single order for ready-mixed placed in the South.

A NEW POWDERED SOAP, made from pumice, is being marketed by a factory at Winner, Tripp county, South Dakota. The source of pumice supply is a pit near Winner, thought to be many thousand yards square, and it is estimated that there are several million tons in various deposits in the state. About 1000 cans of high-grade toilet soap are being produced daily.

RATIONALIZATION in the rock products industry seems to be a subject on which writers in English trade papers have the privilege of expending as much ink or typewriter ribbon as their burning zeal desires. An estimable doctor over there writes a series of articles for a prominent business magazine in which he decries the seeming failure to "cultivate reciprocal vision between classes" and advocates more harmonious relations between labor and capital. It is evident he doesn't think we have it.

~ ~ ~

"THE MEDUSA MIRROR" is the title of a new employes' magazine issued by the Medusa Portland Cement Co. and now in its fourth issue. It's a snappy little pocket-size booklet. W. M. Powell, safety director, is editor-in-chief. Safety occupies an important part in the editorial content and much interest is created by a constant comparison of the various Medusa plant records on lost-time accidents.



Two northwest first-aid teams which are giving a good account of themselves. At the left, the Pacific Coast Cement Co. team from Seattle, showing Plant Manager W. H. Green, A. Mattielli, Ed Pugh, W. N. Roderick, Guy Brooks, Harry Keegan, John Rask and Oscar Neighbors. The team at the right represents Olympic Portland Cement Co., Inc., Bellingham, made up of George M. Watson, captain, Roy Kendal, Frank Leitner, Frank Zettle, Harry Bennett, William Chesney and S. P. Spears. These teams finished second and fourth in the Northwest Regional Safety Meeting. We presented a picture of the winning Superior team in last issue

Safety Awards to Set New Record

Portland Cement Association "Trophy Club" Has 51 Members on Eligible List for This Year

PROSPECTIVE AWARDS to plants in Portland Cement Association membership for operation during the year 1930 without lost time, permanent disability or fatal accident promise to exceed past experience.

This situation became apparent last week when inquiry was made of the association as to the size and membership of the 1930 "Trophy Club." While some increase over last year's list naturally was anticipated as a result of the general improvement in the accident situation in the industry, no one, from Chairman John of the committee on accident prevention to General Manager Kinney of the association, expected to find 51 mills on the eligible list as late as October 20. On October 20, 1929, there were 35 mills listed.

While, according to past experience, some reductions from the present list are likely to occur at this season, somewhat decreased demand may close many mills earlier than usual, with consequent lessening of the possibility of accidents between the present and December 31. Consequently, it is regarded as almost certain that the number of mills with perfect records up to the end of the year will greatly exceed any previous figure and may come near the combined total of the last two years.

Of the mill records which are clear for 1930, 21 were also clear for 1929 or one or more previous years, indicating that to date 30 mills never before entirely free of accidents for a year, are making the safety grade in 1930. The plants on the "perfect" list for 1930 to date (in order of length of accident-free operation), are as follows:

(After each is indicated date of last lost time or other disqualifying accident.)

Cowell Portland Cement Co., Cowell, Calif.—May 11, 1926.
Lehigh Portland Cement Co., Iola, Kan.—September 9, 1926.
Alpha Portland Cement Co., Ironton, Ohio—December 8, 1926.
Medusa Portland Cement Co., Toledo, Ohio—April 5, 1928.
Alpha Portland Cement Co., Martin's Creek, Penn. No. 3—June 3, 1928.
Lehigh Portland Cement Co., Ormrod, Penn., No. 2—July 25, 1928.
International Portland Cement Co., Irvin, Wash. —July 31, 1928.
Lehigh Portland Cement Co., Birmingham, Ala.—August 25, 1928.
Trinity Portland Cement Co., Houston, Texas—November 7, 1928.
Pacific Portland Cement Co., Redwood City, Calif. —November 17, 1928.
Alpha Portland Cement Co., Cementon, N. Y.—December 7, 1928.
Great Lakes Portland Cement Corp., Buffalo, N. Y. —December 19, 1928.
Canada Cement Co., Ltd., Port Colbourne, Ont.—April 12, 1929.
Nazareth Cement Co., Nazareth, Penn.—April 16, 1929.
Three Forks Portland Cement Co., Hanover, Mont. —April 22, 1929.
Lehigh Portland Cement Co., Mitchell, Ind.—June 4, 1929.
Alpha Portland Cement Co., Birmingham, Ala.—June 23, 1929.
Wabash Portland Cement Co., Stroh, Ind.—July 11, 1929.
Vulcanite Portland Cement Co., Vulcanite, N. J., No. 2—July 13, 1929.
Lehigh Portland Cement Co., Sandt's Eddy, Penn. —July 20, 1929.
Crescent Portland Cement Co., Wampum, Penn.—July 29, 1929.
Wellston Iron Furnace Co., Jackson, Ohio—July 31, 1929.
North American Cement Corp., Hagerstown, Md.—August 8, 1929.
Alpha Portland Cement Co., La Salle, Ill.—August 19, 1929.
Petoskey Portland Cement Co., Petoskey, Mich.—August 24, 1929.
Bessemer Limestone and Cement Co., Bessemer, Penn.—August 29, 1929.
Universal Atlas Cement Co., Universal, Penn.—September 3, 1929.
Alpha Portland Cement Co., St. Louis, Mo.—September 13, 1929.
Louisville Cement Co., Speed, Ind.—September 25, 1929.
Lehigh Portland Cement Co., Bath, Penn.—September 26, 1929.
North American Cement Corp., Howes Cave, N. Y. —September 30, 1929.
Manitowoc Portland Cement Co., Manitowoc, Wis. —October 2, 1929.
Pennsylvania-Dixie Cement Corp., Portland Point, N. Y.—October 7, 1929.
Lehigh Portland Cement Co., Mason City, Iowa—October 12, 1929.
Lehigh Portland Cement Co., Fogelsville, Penn.—October 24, 1929.
Medusa Portland Cement Co., Bay Bridge, Ohio—November 1, 1929.
Alpha Portland Cement Co., Manheim, W. Va.—November 8, 1929.
Pacific Portland Cement Co., San Juan Bautista, Calif.—November 13, 1929.
Medusa Portland Cement Co., Dixon, Ill.—November 14, 1929.
Ash Grove Lime and Portland Cement Co., Chanute, Kan.—November 19, 1929.
Diamond Portland Cement Co., Middle Branch, Ohio—November 21, 1929.
Canada Cement Co., Ltd., Exshaw, Alta.—December 5, 1929.
Pennsylvania-Dixie Cement Corp., Nazareth, Penn., No. 4—December 6, 1929.
San Antonio Portland Cement Co., San Antonio, Texas—December 10, 1929.
Newaygo Portland Cement Co., Newaygo, Mich.—December 11, 1929.
Lehigh Portland Cement Co., New Castle, Penn.—December 12, 1929.
Trinity Portland Cement Co., Fort Worth, Texas—December 12, 1929.
Lone Star Cement Co., Houston, Texas—December 13, 1929.
Canada Cement Co., Ltd., Hull, Que., December 14, 1929.
Lone Star Cement Co., Greencastle, Ind.—December 27, 1929.
Medusa Portland Cement Co., York, Penn. (White Mill) ————

Judging by the length of the list and the geographical location of these mills, almost every section of the country is represented as are the various processes and types of mill.

Employes of the Redwood City, Calif., plant, Pacific Portland Cement Co., gathered for dedication of their safety trophy

Redwood City Unveils Trophy

THE PLANT OF THE Pacific Portland Cement Co. at Redwood City, Calif., and its officers and employes, were signally honored on Wednesday afternoon, September 17, when the safety trophy awarded by the Portland Cement Association for a perfect safety record throughout 1929 was unveiled and dedicated.

As the plant is so located at Redwood Harbor that arrangements for suitable entertainment there seemed impracticable, only the formal ceremonies were conducted at the plant, and the general jollification by the mill men, their families and friends was postponed until the following Saturday, when the entire group participated in an all-day picnic at Partola, Calif.

J. H. Colton, vice-president in charge of operations of the Pacific Portland Cement Co., acted as master of ceremonies at the trophy dedication and unveiling and in his opening remarks paid tribute to the loyalty and good comradeship among his men, to which he attributed the greater part of the progress made. A. J. R. Curtis, who was in California at the time, drove to Redwood City especially to represent the Portland Cement Association as presenters of the trophy. Mr. Curtis commented on the increasing number of association trophies being awarded to mills on the Pacific Coast and highly complimented the western cement plants on their interest in banishing personal injury accidents.

The trophy was unveiled by Misses Betty Gillespie and Dorothy Haruff, daughters of well-known members of the Redwood City organization, in the presence of a group consisting only of the mill workers, company officials, and a small group of special guests. Among the latter was H. G. Jacobsen of Chicago, who as head of the association's accident prevention activities a number of years ago inaugurated the annual trophy contest. Mr. Jacobsen spoke briefly and formal acceptance of the monument on behalf of the plant employes was made by Harry Stephens, captain of the Redwood City first-aid team.

The celebration at Partola proved one of the most interesting cement mill picnics of the year. In addition to an excellent barbecue, the committee in charge arranged quite a complete program of events, games and contests. These included a baseball game between the single and the married men; a tug of war between mill departments; a boxing bout between plant champion Norton and K. O. Tavalers, relay races, and a variety of games for ladies and children. It was a great day for Redwood City.

Manitowoc Climbs Into Safety Limelight

OCTOBER 3 WILL go down as a red letter day in Manitowoc, Wis., as a result of the completion by the plant of the Manitowoc Portland Cement Co., at midnight on October 2, of an entire year without an accident causing as much as a day's loss of employment to any man on the pay roll.

Accidents have been increasingly scarce at Manitowoc during the last few years, and a year ago the safety committee, with the complete backing of the workmen, put into force rules which would require any victim of a lost-time accident to show good cause for the mishap or submit to dismissal. These rules were looked upon as very drastic, but not once in the 12 months since adopted has any employe come within their scope.

As the first anniversary day of safe operation approached, unusual interest was evident not only among members of the safety committee but by individual employes in all departments of the organization. The company promised a celebration and the men resolved to take full advantage of the offer. Consequently a banquet and grand jollification of all employes was announced for the evening of October 3, in case of a clear record for 365 days, and the plant organization made good.

By 7 o'clock on the morning of October 3, excitement over the new record had reached the point where immediate outlet was necessary, and 135 jubilant members of the force, headed by Superintendent Town and Assistant Superintendent Minogue, formed a parade. The 7 o'clock whistle, usually a modest blast, aroused the plant and town alike to the fact that something entirely unique was taking place. The parade, decorated with signs and banners and keeping step to the clamor of improvised tom-toms beaten merrily by plant blacksmiths and machinists, moved with happy stride over the plant property and finally dispersed to start a second no-accident year.

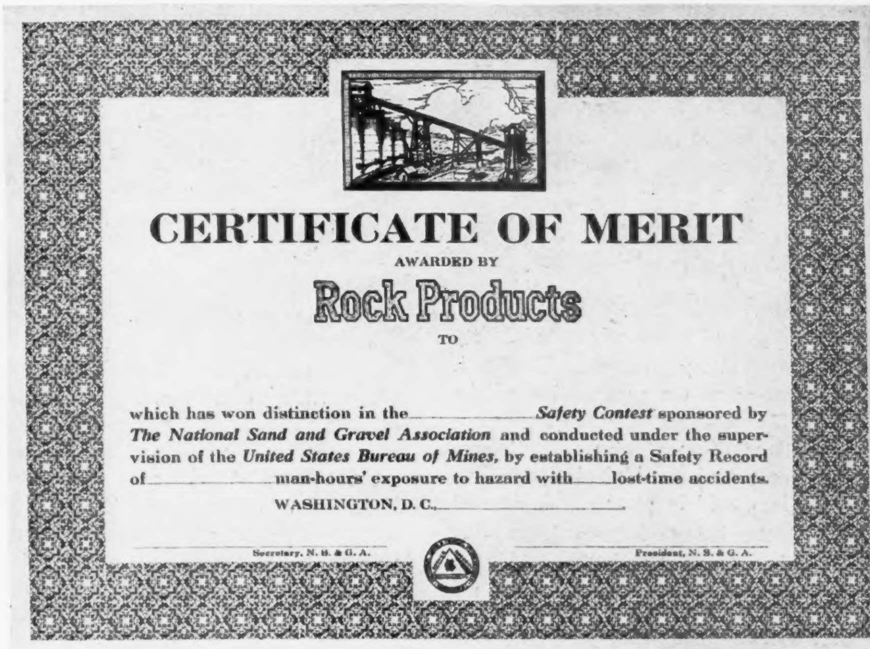
Vice-President Henry Vanderwerp gave orders for an evening party at the K. of C. club house which should dwarf all pre-

vious efforts in that direction. He stated that the "no-accident" year also had been one unsurpassed for general operating efficiency, low labor turnover and evident co-operation throughout. With the exception of a small force required to keep the plant in operation, all of the employes assembled at the club house between 4:30 and 5 p. m. to participate in the prize bowling and quoits matches and card games arranged before dinner.

Mr. Vanderwerp was master of ceremonies, introducing as speakers W. L. White, Jr., general superintendent, Medusa Portland Cement Co., of which the Manitowoc is a subsidiary; Dr. C. L. R. MacCollum, company physician and surgeon at Manitowoc; W. L. Wallace, general manager, Manitowoc Shipbuilding Corp.; A. J. R. Curtis, assistant to general manager, Portland Cement Association, Chicago; J. E. Thiell, secretary, Manitowoc Shipbuilding Corp.; W. M. Powell, safety director, Medusa Portland Cement Co.; L. E. Smith, superintendent, Newaygo Portland Cement Co., Newaygo, Mich., and Superintendent F. E. Town of the Manitowoc plant.

After the talks, W. M. Powell presented some interesting motion pictures, after which the dinner party was adjourned and the crowd resumed the schedule of games which had been interrupted for the banquet. At 9:30 p. m. men at the party replaced those who had remained on duty at the plant and the latter were immediately brought to the club house, where a second dinner was served for them and a number of the speakers at the earlier dinner addressed this group.

Plans are already under way for a big demonstration on New Year's day, should the plant be successful in its efforts to complete 1930 without accident. The splendid impression left on the community by the safety record of one year and by the demonstration on October 3 was indicated by the extensive editorial comment in the Manitowoc newspapers.



Four sand and gravel plants received honorable mention in the safety contest conducted during 1929 by the association under the auspices of the United States Bureau of Mines

Sand and Gravel Firms Win Honorable Mention in 1929 Safety Contest

CERTIFICATES OF MERIT have been awarded to the following firms for their excellent showing in the 1929 safety contest conducted by the National Sand and Gravel Association under the auspices of the United States Bureau of Mines:

Yahola Sand and Gravel Co., Keough, Okla.

American Aggregates Corp., Red Bank Plant No. 1, Cincinnati, Ohio.

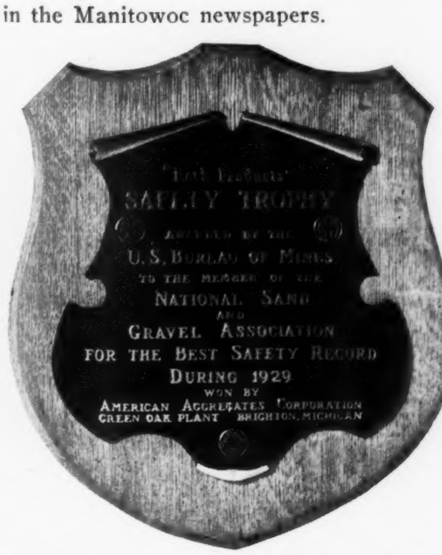
American Aggregates Corp., Red Bank Plant No. 2, Cincinnati, Ohio.

American Aggregates Corp., Plant No. 1, Columbus, Ohio.

Due to the late start, the contest interested only 26 firms, yet it created an inestimable amount of enthusiasm for the movement to reduce accidents in the sand and gravel industry. The two major awards, bronze placques, also given by ROCK PRODUCTS, were won by the American Aggregates Corp., Green Oak plant, Brighton, Mich., in the "large plant" class, and the Urbana Sand and Gravel Co., Urbana, Tex., for the "small plant" division. The official major awards were made during the last annual convention of the National Sand and Gravel Association.

A complete report of the contest is covered by United States Bureau of Mines Report of Investigations 3009, reprinted in the April 26 issue of ROCK PRODUCTS. In it, W. W. Adams, supervising statistician of the Bureau of Mines, the bureau's contact man, revealed some significant facts. The contest covered 2,259,572 man-hours of exposure and there were 168 lost-time accidents. One small plant, unfortunately, had an employe killed by accident which resulted in a charge of 6,000 lost-days against the plant's record and brought the accident severity rate for all the plants in the contest up to 9.713. Without this accident, the rate would have been 7.077 and would have given the sand and gravel industry a better average than most industries with equally hazardous conditions.

The success of last year's contest has brought increased interest in the subject of safety in sand and gravel operations. Approximately 100 plants have entered this year and the results are expected to show a greatly reduced frequency and severity rate in an industry that, before last year, had never undertaken any concerted campaign looking toward the promotion of safety work and elimination of accidents.



Safety trophy awarded Brighton, Mich., plant, American Aggregates Corp., winner in the "large plant" class

Urbana Sand and Gravel Co., Urbana, Tex., won the "small plant" safety trophy for the best record in 1929

Fatal Crushing Plant Accident

ADAM WILSON, 55, an employe of the Scioto Lime and Stone Co., four miles west of Delaware, Ohio, was fatally injured October 10, when he fell into a crusher at the company's plant.—*Cleveland* (Ohio) *Press.*

Scott W. Turner's Tribute to the Cement Industry

IN HIS ADDRESS to the National Safety Congress in Pittsburgh, Penn., October 1, on the occasion of the presentation of the Joseph A. Holmes Safety Award to the Lehigh Portland Cement Co., Scott W. Turner, director of the United States Bureau of Mines, said in part:

"One of the objects of the Joseph A. Holmes Safety Association is the making of one or more annual awards, with or without honorariums each to be known as the "Holmes Safety Award" for the encouragement of those originating, developing and installing the most efficient safety devices, appliances, or methods, in the mining, quarrying, metallurgical, and mineral industries, these designations are the result of reports and investigations by the officers and representatives of the association. We occasionally give a certificate of honor for some outstanding safety record or performance. It is to make one of these presentations that I now address you.

"It has been said that safety is the cornerstone of efficiency. If this is so, then the portland cement industry is among the most efficient industries in the United States. I do not know of another major industry that so consistently, from year to year, occupies such an enviable position of leadership in the safety movement. Individual companies in many lines of work have forged ahead of their associates in their efforts to prevent accidents, but in the manufacture of portland cement we have a conspicuous example of an entire industry where safety has been promoted to a remarkable degree.

"With the cement industry so generally active in the furtherance of safety, it is obvious that leadership among the individual companies that make up that industry must imply an unusual degree of success in the prevention of accidents. It developed upon us to determine the real leader within this industry. We searched the field for the outstanding example of success in safety work, and we discovered that amidst the numerous excellent records of safety achievement within the portland cement industry, the most distinguished instance among the more than 150 plants entered in the Portland Cement Association contest was that of the Lehigh Portland Cement Co.

"The Holmes Association was quick and unanimous in selecting that company for special recognition and honor, for the signal success attending its efforts in safeguarding its employes from occupational hazards. A diploma was awarded and I will now present it. May I read what appears on this special certificate of honor which I hold in my hand? It tells its own story:

THE JOSEPH A. HOLMES
SAFETY ASSOCIATION
Awards to the
LEHIGH PORTLAND CEMENT CO.
This
CERTIFICATE OF HONOR

For its exceptionally good safety work and record. From 1924 to 1929, inclusive, except in 1925, one or more of its 15 cement plants won the Portland Cement Association Trophy for working without a lost-time accident through the calendar year. Five plants of this Company won this trophy in 1928 and four in 1929. The Iola, Kansas, plant, with over 200 employes, has not had a lost-time accident for nearly three and one-half years, and the Ormrod, Penn., plant has been free of lost-time accidents for over two years.

"The president of the Lehigh Portland Cement Co. is Col. E. M. Young. He is here today, and he may well feel proud of his organization. It is a pleasure and a privilege to present to Colonel Young this certificate of honor which has been awarded to his company by the Joseph A. Holmes Safety Association."

Colonel Young, in his acceptance speech, said in part:

"The National Safety Council was organized in 1912; the Portland Cement Association took up safety work in 1913; the Lehigh Portland Cement Co. started its safety work the same year and in 1914 organized safety committees at all its plants. In the early days of this movement, there seemed to be considerable doubt and uncertainty as to what could be accomplished. Personally I was very skeptical but as the years have passed and the wonderful results secured, I now am a very firm believer in all that goes with safety work.

"The plant of the Lehigh company at Iola, Kan., employing 200 men, has now operated continuously for over four years without a lost-time accident. This is an illustration of what can be done with proper leadership and with the enthusiastic and loyal support of all the employes of a plant.

"Col. Henry A. Reninger is in direct charge of safety work at all plants of the Lehigh company. He deserves high praise and commendation for the results obtained."

Hazards of Transporting Explosives in Automobile Trucks

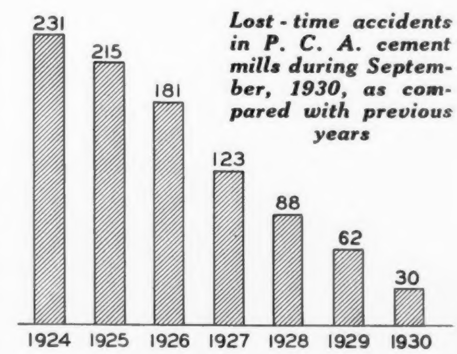
INFORMATION CIRCULAR 6330 recently published by the Bureau of Mines, Department of Commerce, points out some of the dangers connected with the transportation of explosives in automobile trucks, and gives the safety rules recommended by the Institute of Makers of Explosives, explosives manufacturers, and the explosives division of the Bureau of Mines. It advises that all trucks used for that purpose be always kept in first-class repair, that there should be no exposed metal on the inside of the truck body, or if there is that it should be covered so that the explosives containers will not come in contact with it, that the boxes of explosives be arranged so that they cannot shift about during transportation, that they rest upon and be covered by a canvas or tarpaulin, or preferably be placed and locked in a wooden box, and that blasting caps or electric exploders never be carried with explosives.

This circular may be obtained from the Bureau of Mines, Washington, D. C.

September Accidents in Cement Mills Show Decided Drop

SEPTEMBER ACCIDENTS in the cement mills and quarries reporting to the Portland Cement Association show a drop, which establishes a new monthly record—the lowest in frequency since the report system of the association became operative some 14 years ago. During the month there were reported 28 lost-time and 2 fatal accidents, a total of 30 recordable mishaps as against 36 lost-time and no fatal accidents during the previous low frequency month, June, 1930.

By comparison with September, 1929, last month's figures show up unusually well. During the former month, in which 17,223,000 bbl. of cement were produced in the United States, 139 operating plants which



Lost-time accidents in P. C. A. cement mills during September, 1930, as compared with previous years

report accidents to the association suffered 61 lost-time accidents and 1 fatality. During September, 1930, with the total American production at 16,124,000 bbl., 150 mills report 28 lost-time and 2 fatal accidents. Both of these months were heavy operating periods. During June, 1930, there were 17,239,000 bbl. produced in the United States and the 150 reporting mills suffered 36 lost-time accidents as mentioned above.

While a few late accident reports may yet arrive to raise the September total, the record of the month will stand as an unusually good one.

Photo by Wide World Photos

William Copley beside his "Long Tom" trough from which he recovers more or less free coarse gold

Gold in the Gravel of Armstrong County, Pennsylvania

PICKING up a Pittsburgh newspaper while in that city attending the National Safety Congress, the editor noted quite a story on a gold discovery in a commercial sand and gravel operation on Spring Hill, between Ford and Kittanning, Armstrong county, Penn. The article immediately recalled some previous correspondence with this sand and gravel operator, who had inquired of us the methods used to recover gold in some of the West Coast sand and gravel operations, where small amounts of gold are frequently present.

Rather than reproduce the newspaper story we prevailed upon W. N. R. Copley, proprietor of the Copley Sand and Gravel Co., Manorville, Penn., to tell the story in his own words. Here it is:

"In the fall of 1925 the late John Berford, contractor, a native of Canada, and one of the survivors of the Klondike rush, had a contract with the Ford City (Penn.) Borough for the installation of a sewage pumping station, to take care of the sludge from the city sewers after the Allegheny river slack-water brought the river level to a height that the sewer levels of the borough were too low for free flow and necessitated the sludge pumping plant. Well, our crude placer sand and gravel plant furnished the sand and gravel for his job and one day I dumped a load for him and was just about to step on the gas for another trip to the bins when Johr hailed me to wait.

"He came up holding a piece of quartz in his hand and asked me to have a look. I was astonished to note a layer of what appeared to be gilt foil between the layers of quartz. He told me it was what the gold miners called a dike. And that was the beginning of my observations and explorations with Mr. Berford. He supervised the construction of a settling trough or "Long Tom," where the sediment or concentrates are recovered by tapping of the main sluice, and from then on, we have been getting more or less free coarse gold. The gold is recovered by first robbing the riffle or "Long Tom" and the panning of the concentrate. The concentrate or black sand is of various worth, and we give results from some assays made by Geo. J. Ermlich, of Denver, Colo.:

Date sent	Sample	Worth, per ton
12/14/26	Black sand	$12.81
6/20/27	Black sand	17.60
9/22/30	Black sand	79.64

"Just recently we find considerable gravel of rotten granite and quartz structure that shows very rich in color and has been highly regarded by experienced gold prospectors and refiners. It has been strongly suggested that there should be a stamp mill process installed to get the correct production. And I agree with this suggestion, as the steady unabating production is regular and who can tell what lies just a little deeper or in a little farther, where no man has seen?

"May I add a few wholly individual ideas on the responsibility for the presence of gold in this out-of-the-way place.

"First, the gravel and sand from which we extract this gold with black sand, has been identified as identical with that of the Yukon river in Alaska.

"Secondly, as Ontario, Canada, is north of us and Ontario has many rich mines, where the ores are taken from strata that are almost perpendicular, this would indicate to me that the surface of the land upon which is now erected the tipples and elevator equipment was not always as is, but rather that level was once the base of a chain of mountains caused by upheaval and the tops

Photo by Wide World Photos

Crane serving stone to crusher where pulverizing assists in extracting the gold

Photo by Wide World Photos

A view of William Copley's quarry showing the water trough where the sand containing gold is washed down

decapitated by glacial action during the period when the northern hemisphere was giving up what was supposed to be the greatest ice cap in this planet's existence, due to the appearance of the sun or the earth's slipping into new realms of space, sort of snuggling up to the sun to a safe distance of so many million miles.

"And the rapidity by which the heat moved the ice and water down over the crest of the hemisphere did some terrible cutting, wearing and grinding with the possibility of one big ice cake carrying vast tonnages of rock for great distances at speeds that would make present day speed kings look like snails. And who will say that a vast glacial river did not course its way down from or near the direction of Alaska, through Canada in an east to west and southerly direction and pass into the United States over the foothills of the Allegheny Mountains which includes this territory?

"However, it is here, and it must be elsewhere along the course of the glacial movement and to my mind it is a matter of back tracking on this movement, and the farther back the more wealth in larger nuggets, for the farther the flotation the more percolation and sedimentation and consequently the farther frcm place of origin the finer and fewer the pieces of the free gold."

Proceedings of the 1930 Crushed Stone Convention

THE FULL PROCEEDINGS of the 1930 convention of the National Crushed Stone Association are now available in bound form. This 400-page book giving in detail all papers, discussions, committee reports, etc., may be obtained from J. R. Boyd, secretary, National Crushed Stone Association, 1735 14th St., N. W., Washington, D. C.

International Road Congress Adopts Conclusions Re Concrete Roads

SIFTING the experiences of various nations with the growing problem of highway traffic, the Sixth Congress of the Permanent International Association of Road Congresses, assembled at Washington to promote world-wide road improvement, adopted on October 7 tentative conclusions concerning the construction, maintenance, and administration of highways.

Dividing itself into two sections, the congress, approximately 1000 delegates from nearly every country in the world, simultaneously proceeded with the actual business of its program. The first section, occupied with what was designated in the agenda of the congress as first question, namely, the results obtained by the use of (a) cement and (b) bricks or other artificial paving, heard reports concerning the experiences with the use of these materials. The section unanimously adopted the conclusions presented, with alterations, by Frank T. Sheets, chief highway engineer, State of Illinois, concerning the results obtained by the use of cement.

Among these conclusions, as adopted by the section, it was recognized that cement, as a paving material, has many inherent advantages; that 2-course concrete pavements, with the upper layer composed of very hard aggregates, have been necessary where a large volume of steel-tired traffic is encountered; that construction operations are performed mostly by machinery, with resulting lower cost and better workmanship; and that maintenance of concrete surfaces, properly constructed is relatively simple and reasonable in cost.

The conclusions adopted were:

1. Cement is becoming generally used as a paving material and has many inherent advantages.

2. It has been used successfully in the construction of cement concrete base courses for other surfaces, for cement concrete pavements, and for cement-bound macadam.

3. Cement concrete pavements and also cement concrete base courses protected by appropriate wearing surfaces are suited to heavy traffic.

4. Where a large volume of steel-tired traffic is encountered, two-course concrete pavements, with the upper layer composed of very hard aggregates, have been necessary and successful. Other surfaces on concrete base courses have also satisfactorily met this condition.

5. Single course pavements have successfully carried maximum volumes of traffic and maximum wheel loads when the traffic was largely rubber-tired.

6. Cement-bound macadam has been successful on roads carrying light traffic not inimical to the macadam type of construction.

7. In designing cement concrete pavements and cement concrete base courses to be surfaced with other materials, the resulting pavements should have equal load-carrying capacity of structural strength, when similar traffic conditions are to be met.

8. Competent engineering supervision of design, construction and maintenance of cement concrete pavements is necessary to insure good results.

9. Subgrades must be uniform and stable.

10. Pavement slabs must be designed to carry expected loads. Edge thickening is advantageous as a means of producing an economic and balanced structural design for concrete pavement slabs.

11. Longitudinal and transverse joints are commonly used and must be designed to meet traffic, subgrade and climatic conditions.

12. Scientific design of concrete mixers and weight proportioning of aggregates represent the modern practice.

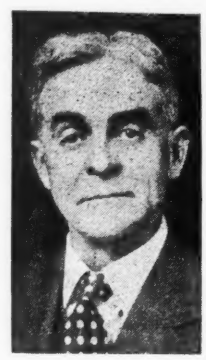
13. Construction operations are performed mostly by machinery, with resulting lower cost and better workmanship.

14. Thorough curing of concrete surfaces is essential.

15. Maintenance of concrete surfaces, properly constructed, is relatively simple and reasonable in cost.

James H. Fribley

JAMES H. FRIBLEY, prominent sand and gravel producer of Burbon, Ind., died October 2 from injuries received in an automobile accident while returning home in the evening from his plants near Plymouth, Ind. He was born June 6, 1867, on a farm near Mentone, Ind. All his early life was spent as a merchant, and was at one time a vice-president of the National Retail Merchants Association. A few years ago he bought two gravel properties near Plymouth and all his time recently has been devoted to their development.



James H. Fribley

Mr. Fribley was much honored and respected in his home community and was active in many civic enterprises.

Correction

IN the description of the Whiterock Quarries plant in the article "Pennsylvania Lime Producers Learn Readjustment," Rock Products, October 11, pp. 60-68, it was stated that the Kent mills used to make pulverized limestone operated in closed circuit with an 8-ft. Sturtevant air separator. It should have read that these mills operate in closed circuit with a 9-ft. Kent filter air separator, made by the Kent Mill Co.

As They Do It in Old New York

MORE than 1000 of the 1500 invited guests attended the annual clam bake of the O'Brien Brothers Sand and Gravel Co. of Port Washington, Long Island, held recently at Karatsonyi's hotel in Glenwood. Guests from New York City were taken to Glenwood by the ship *Belle Island*, which had aboard two orchestras from the Cotton Club.

At the pavilion, where the clam bake was held, the Nassau County bank furnished the music, while several boxing bouts were staged for the amusement of the guests, with Joseph Humphreys acting as announcer. It is estimated that the bake, which was one of most elaborate ever given by this company, cost the hosts around $18,000.

Prominent prize fighters who engaged in the bouts were Primo Carnera, Maxey Rosenbloom, Al Singer, George Godfrey and Mickey Walker.

Among the prominent New York City officials and business men present were Commissioner of Police Edward J. Mulrooney, former Police Commissioner George V. MacLaughlin, Joseph V. McKee, Charles J. Dodd, district attorney of Brooklyn; Samuel Rosoff, president of the Rosoff Subway Construction Co.; Gene Pope, president of the Colonial Sand and Gravel Co.; John Curry, Tammany Hall leader, and Joseph and Edward Byrne, sons of the president of Brooklyn.—*Port Washington* (N. Y.) *Post.*

New York Crushed Stone Association Holds October Meeting

THE NEW YORK CRUSHED STONE ASSOCIATION held its October meeting at the Hayward hotel, Rochester, N. Y., on Wednesday, October 15. The meeting was presided over by the president, John Odenbach, with A. S. Owens, secretary.

After reading the minutes of the previous meeting the chair called upon A. G. Seitz, of the General Crushed Stone Co., to give those present an outline of the Albany session pertaining to the proposed state bonding law for public-works contractors. From Mr. Seitz' remarks it would seem that material dealers and producers are not satisfied with the protection offered them by the present lien laws and deem the enactment of a bonding law a desirable piece of legislation. It is expected that the bonding law will pass.

John Rice, Sr., of the General Crushed Stone Co., gave a short outline of the workings of the Pennsylvania bonding law and stated that while the law was not a cure-all for the troubles it was intended to correct, yet it was far better than no law at all and urged that the New York law be pressed through the legislature. Mr. Rice spoke of the tendency of the bonding companies to evade payment on technicalities and hence the necessity of the producer's protecting himself by keeping all necessary records of shipments, so that in the event of failure of payment for a certain job, that records could be presented to prove that the material in question went into the highway and was not diverted to other uses. It developed in the discussion that 35 states out of the 48 have bonding laws to protect the material dealer and material producer and this fact should be of no little influence in getting New York state to do likewise.

Apparently there have been rumors afloat in western New York in regard to requiring the washing of crushed stone, and John Odenbach asked those present if they had heard such rumors. Judging from reports given these rumors have some foundation, and it is within the realm of possibility that stone producers in New York state may have to wash their products to meet state highway specifications. Several claimed that there had been many instances in western New York where concrete highways had failed or partially failed, and that unless the stone producer was on his toes to guard against innuendo that these failures would be attributed to unwashed stone. This, to an engineer, would be difficult to prove, for there are miles and miles of highway that have not failed that were built of unwashed material. The consensus of opinion was that concrete advocates would have to build better roads to maintain the past popularity of concrete in the state.

Registration

Buffalo Crushed Stone Co., Buffalo, James Savage, F. W. Schmidt and A. J. Hooker.

Dolomite Products Co., Inc., Rochester, John H. Odenbach, A. Sickles and Harvey N. Clark.

Eastern Rock Products, Inc., Utica, A. S. Owens.

General Crushed Stone Co., Easton, Penn., John Rice, Sr., A. G. Seitz, W. L. Sporburg, F. C. Owens, Geo. E. Schaefer, L. M. Croll and Robert Hickey.

Genesee Stone Products Corp., Batavia, A. B. Caldwell and F. T. Biff.

Jointa Lime Co., Glens Falls, H. J. Russell.

LeRoy Crushed Stone Corp., LeRoy, J. L. Hemlich and J. Moore.

Solvay Process Co., Syracuse, L. J. Crate and H. J. Kaiser.

Wickwire Spencer Steel Co., Buffalo, W. E. Foote.

Miscellaneous—Wm. Anderson, Hercules Powder Co.; Darrol Cheney, Marion Steam Shovel Co.; H. Conley, Peerless-Union Explosives Co.; B. H. Norton, E. I. DuPont de Nemours and Co., and Walter B. Lenhart, ROCK PRODUCTS.

Mississippi Sand and Gravel Producers Active

NEW ACTIVITY in south Mississippi road material concerns is under way in view of opening up of initial steps for construction of county roads, and for possibilities of a larger part of the $3,400,000 appropriation in road material funds, to be spent in Forrest county.

Sand and gravel operators of Hattiesburg, which long has been an important center for distribution of construction materials in southern building operations, have taken steps to expand. The American Sand and Gravel Co. of this city has doubled capacity of its plants, officers have announced.—*Birmingham* (Ala.) *Age-Herald.*

Rumor That United States Gypsum Is Interested in Zonolite

STOCKHOLDERS of the Zonolite Co. of Libby, Mont., have received a letter from that concern in which it is stated that the United States Gypsum Co. is interested in buying the Libby firm.

Some months ago C. R. Birdsley, director of research and development of the United States Gypsum Co., Chicago, Ill., inspected the zonolite deposit near Libby and expressed himself as being impressed with the immense deposits of mica.

The letter indicates that the United States Gypsum Co. would prefer to buy the property outright but also would be interested in contracting for zonolite tonnage.—*Great Falls* (Mont.) *Tribune.*

Leathem D. Smith Heads New York Gravel Dredging Concern

LEATHEM D. SMITH, on a recent trip to his home in Sturgeon Bay, Wis., stated that he has been traveling almost continuously since Labor day, making three trips to New York, one to New Orleans, also to Toronto and Detroit in connection with various jobs which the Leathem D. Smith Dock Co. are working on.

While in New York, a plan was worked out with one of the large gravel producers for the formation of a new corporation to be known as the Sound Gravel Co., a Delaware corporation, to own and operate the steamer *Bay State,* dredging gravel in Long Island sound and to deliver it in New York city. The main office of the new corporation will probably be in New York City, but the local concern will hold 60% of the stock. Officers are Leathem D. Smith, president; Frank J. Gallagher, vice-president; John Gallagher, treasurer, and T. A. Sanderson, secretary. The four officers and Sydney T. Smith constitute the board of directors.

While in Toronto Mr. Smith inspected the Diesel electric ship *Cementkarrier,* built in England last winter and equipped with the Smith Dock Co.'s tunnel scraper system, which scrapers deliver the cement to Fuller-Kinyon pumps for pumping the cement ashore. The vessel was on her trial trip and worked successfully, and has since carried half a dozen or more cargoes. She is the first boat equipped with this combination equipment.

Telling of his trip to New Orleans, Mr. Smith said that the work on the steamer *Bremerton,* which is being equipped with Smith self-unloading equipment, is progressing in a very satisfactory manner. More than 500 men are working on this ship, in two shifts. The total conversion contract totals over $500,000, and she will be finished about November 1.—*Green Bay* (Wis.) *Press-Gazette.*

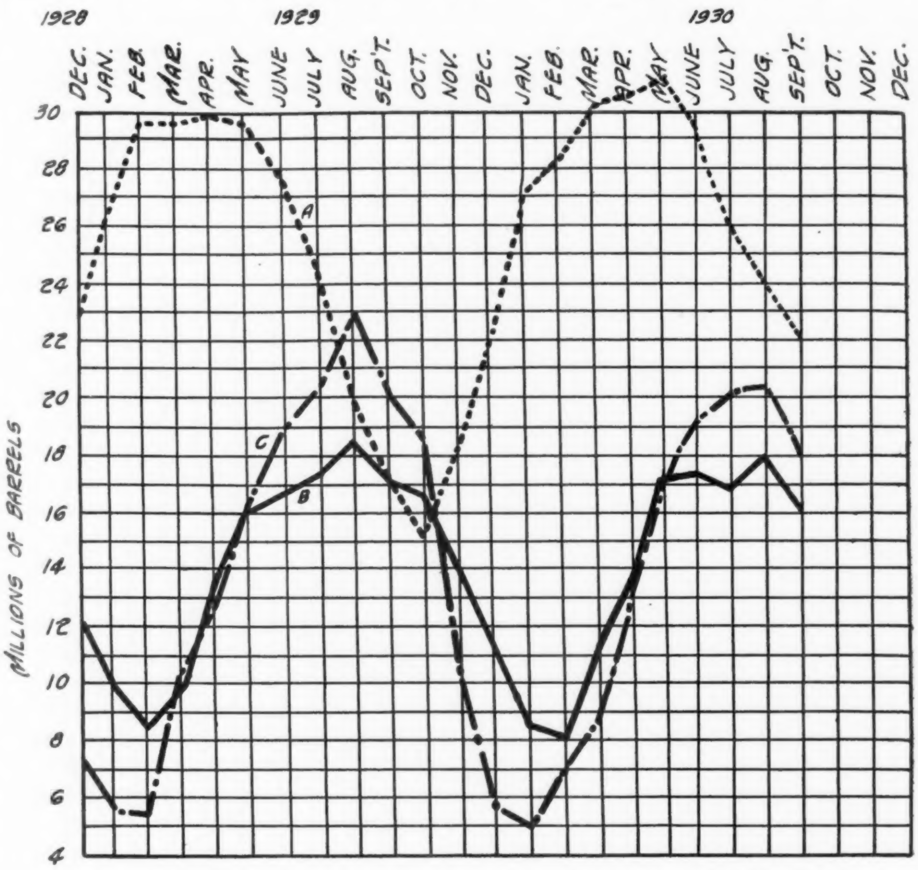
Portland Cement Output in September

THE PORTLAND CEMENT industry in September, 1930, produced 16,124,000 bbl., shipped 18,083,000 bbl. from the mills, and had in stock at the end of the month 21,864,000 bbl. according to the United States Bureau of Mines, Department of Commerce.

The production of portland cement in September, 1930, showed a decrease of 6.4% and shipments a decrease of 9.4%, as compared with September, 1929. Portland cement stocks at the mills were 26.2% higher than a year ago.

The total production for the nine months ending September 30, 1930, amounts to 126,917,000 bbl., compared with 128,199,000 bbl. in the same period of 1929, and the total shipments for the nine months ending September 30, 1930, amounts to 128,673,000 bbl., compared with 133,569,000 bbl. in the same period of 1929.

In the following statement of relation of production to capacity the total output of finished cement is compared with the estimated capacity of 166 plants both at the close of September, 1930, and of September, 1929. In addition to the capacity of the new plants which began operating during the twelve months ended September 30, 1930, the estimates include increased capacity due to extensions and improvements at old plants during the period.



(a) Stocks of finished portland cement at factories; (b) production of finished portland cement; (c) shipments of finished portland cement from factories

RELATION OF PRODUCTION TO CAPACITY

	September 1929 Pct.	September 1930 Pct.	Aug. 1930 Pct.	July 1930 Pct.	June 1930 Pct.
The month	81.8	75.7	81.0	77.8	81.4
12 months ended	67.5	65.2	65.6	66.1	66.4

Distribution of Cement

The following figures show shipments from portland cement mills distributed among the states to which cement was shipped during July and August, 1929 and 1930:

PORTLAND CEMENT SHIPPED FROM MILLS INTO STATES IN JULY AND AUGUST, 1929 AND 1930, IN BARRELS*

Shipped to	1929—July	1930	1929—August	1930
Alabama	227,381	137,184	271,466	106,464
Alaska	2,307	1,774	2,105	4,465
Arizona	46,241	34,382	57,184	51,855
Arkansas	181,615	184,225	187,688	165,886
California	905,437	846,508	1,007,181	869,963
Colorado	107,528	92,898	105,397	106,576
Connecticut	213,551	191,178	241,126	205,553
Delaware	43,016	68,752	56,135	47,898
District of Columbia	118,426	87,492	125,732	126,581
Florida	99,338	105,993	100,975	85.673
Georgia	157,113	147,652	160,279	186,694
Hawaii	21,348	18,164	26,037	19,301
Idaho	33,383	51,059	26,051	52,084
Illinois	1,835,790	1,495,891	1,969,576	1,604,378
Indiana	745,533	864,425	990,059	686,122
Iowa	809,784	1,184,588	1,108,711	1,077,919
Kansas	225,611	226,827	338,052	271,491
Kentucky	187,060	223,147	205,597	265,288
Louisiana	117,311	308,306	172,697	235,564
Maine	73,594	95,005	79,258	128,866
Maryland	305,219	274,298	323,021	314,239
Massachusetts	335,635	324,874	365,297	328,187
Michigan	1,677,282	1,253,055	1,891,753	1,269,546
Minnesota	478,941	647,064	533,434	602,931
Mississippi	109,161	66,721	131,963	96,483
Missouri	725,967	737,463	896,327	770,346
Montana	67,366	37,429	89,417	36,407
Nebraska	150,214	210,545	270,919	226,618
Nevada	10,841	15,694	12,186	14,645
New Hampshire	98,708	80,647	116,275	81,651
New Jersey	877,662	788,857	958,357	709,844
New Mexico	25,281	31,722	29,932	36,680
New York	2,596,425	2,474,955	2,768,232	2,596,407
North Carolina	171,148	108,620	149,085	116,028
North Dakota	69,425	53,178	47,870	31,984
Ohio	1,236,231	1,294,504	1,364,665	1,286,700
Oklahoma	323,528	362,973	371,205	360,766
Oregon	101,161	116,047	124,852	114,400
Pennsylvania	1,565,726	1,915,236	1,710,648	1,912,983
Porto Rico	7,702	8,250	6,995	4,500
Rhode Island	73,134	66,903	101,278	83,057
South Carolina	140,609	185,517	89,733	236,649
South Dakota	61,786	82,598	55,114	72,829
Tennessee	†405,704	267,623	†441,869	285,916
Texas	†771,695	644,850	877,463	605,660
Utah	43,737	38,485	57,547	44,554
Vermont	145,097	112,145	181,612	104,324
Virginia	194,236	182,631	205,771	179,227
Washington	263,893	330,911	310,711	341,647
West Virginia	194,649	199,923	209,590	216,018
Wisconsin	823,678	810,875	952,914	842,250
Wyoming	21,230	23,380	26,480	20,642
Unspecified	40,750	0	†89,633	20,373
	20,265.188	20,113.423	22,993,454	20,263,112
Foreign countries	53,812	39,577	58,546	35,888
Total shipped from cement plants	20,319,000	20,153,000	23,052,000	20,299,000

*Includes estimated distribution of shipments from three plants in July and August, 1929; from two plants in July and August, 1930.
†Revised.

PRODUCTION AND STOCKS OF CLINKER, BY MONTHS, IN 1929 AND 1930, IN BARRELS

Month	1929—Production	1930	Stock at end of month 1929	1930
January	12,012,000	10,504,000	**9,642,000**	**9,646,000**
February	11,255,000	10.008,000	**12,436,000**	**11,572,000**
March	12,450.000	13,045,000	**14,948,000**	**13,503.000**
April	14,166,000	15,025,000	**15,479,000**	**15,164,000**
May	15,444,000	16,607,000	**14,911,000**	**14.668.000**
June	15,312,000	15,895,000	**13,587,000**	**13,452,000**
July	15,214,000	15,067,000	**11,619,000**	**11,682,000**
August	15,829,000	15,237,000	**8,995,000**	9,266,000
September	15,165,000	14,587,000	**7,009,000**	7,852,000
October	15,515,000		**5.934.000**	
November	14,087,000		**6,134,000**	
December	12,539,000		**7,526,000**	

*Revised.

PRODUCTION, SHIPMENTS AND STOCKS OF FINISHED PORTLAND CEMENT, BY DISTRICTS, IN SEPTEMBER, 1929 AND 1930, AND STOCKS IN AUGUST, 1930, IN BARRELS

District	Production 1929—Sept.	Production —1930	Shipments 1929—Sept.	Shipments —1930	Stocks at end of month 1929	Stocks at end of month 1930	Stocks at end of Aug., 1930*
Eastern Penn., N. J., Md.	3,600,000	3,273,000	*3,924,000	3,813,000	4,452,000	4,969,000	5,509,000
New York and Maine	1,241,000	1,238,000	1,434,000	1,467,000	1,274,000	1,069,000	1,298,000
Ohio, West'n Penn., W. Va.	1,919,000	1,873,000	2,386,000	1,984,000	2,685,000	3,079,000	3,190,000
Michigan	1,519,000	1,242,000	1,800,000	1,381,000	*961,000	2,279,000	2,418,000
Wis., Ill., Ind. and Ky.	2,182,000	2,171,000	2,759,000	2,716,000	1,740,000	2,751,000	3,295,000
Va., Tenn., Ala., Ga., Fla., La.	1,298,000	1,198,000	1,3T1,000	1,178,000	1,610,000	1,813,000	1,794,000
East'n Mo., Ia., Minn., S.D.	1,670,000	1,748,000	2,325,000	2,116,000	1,426,000	1,569,000	1,937,000
Western Mo., Neb., Kansas, Okla. and Ark.	1,422,000	1,233,000	1,542,000	1,227,000	*798,000	1,643,000	1,637,000
Texas	707,000	679,000	*681,000	599,000	*492,000	707,000	627,000
Colo., Mont., Utah, Wyo., Ida.	314,000	260,000	358,000	258,000	475,000	511,000	509,000
California	967,000	806,000	1,023,000	905,000	941,000	1,005,000	1,105,000
Oregon and Washington	384,000	403,000	407,000	439,000	471,000	469,000	505,000
	17,223,000	16,124,000	19,950,000	18,083,000	17,325,000	21,864,000	23,824,000

PRODUCTION, SHIPMENTS AND STOCKS OF FINISHED PORTLAND CEMENT, BY MONTHS, IN 1929 AND 1930, IN BARRELS

Month	1929—Production	—1930	1929—Shipments	—1930	Stocks at end of month 1929	Stocks at end of month 1930
January	9,881,000	8,498,000	5,707,000	4,955,000	26,797,000	27,081,000
February	8,522,000	8,162,000	5,448,000	7,012,000	29,870,000	28,249,000
March	9,969,000	11,225,000	10,113,000	8,826,000	29,724,000	30,648,000
April	13,750,000	13,521,000	13,325,000	13,340,000	30,151,000	30,867,000
May	16,151,000	17,249,000	16,706,000	17,224,000	29,624,000	30,891,000
June	16,803,000	17,239,000	18,949,000	18,781,000	27,505,000	29,364,000
July	17,315,000	17,078,000	20,319,000	20,153,000	24,525,000	26,289,000
August	18,585,000	17,821,000	23,052,000	20,299,000	20,056,000	*23,824,000
September	17,223,000	16,124,000	19,950,000	18,083,000	17,325,000	21,864,000
October	16,731,000	....	18,695,000	....	15,381,000	....
November	14,053,000	....	11,222,000	....	18,213,000	....
December	11,215,000	....	5,951,000	....	23,550,000	....
	170,198,000	....	169,437,000	....	....	....

PRODUCTION AND STOCKS OF CLINKER (UNGROUND CEMENT), BY DISTRICTS, IN SEPTEMBER, 1929 AND 1930, IN BARRELS

District	1929—Production	—1930	Stocks at end of month 1929	Stocks at end of month 1930
Eastern Pennsylvania, New Jersey and Maryland	3,250,000	2,919,000	1,297,000	1,300,000
New York and Maine	1,023,000	1,180,000	507,000	454,000
Ohio, Western Pennsylvania and West Virginia	1,624,000	1,622,000	607,000	748,000
Michigan	1,239,000	1,006,000	538,000	800,000
Wisconsin, Illinois, Indiana and Kentucky	1,731,000	1,665,000	512,000	878,000
Virginia, Tennessee, Alabama, Georgia, Florida, Louisiana	*1,157,000	1,197,000	686,000	925,000
Eastern Missouri, Iowa, Minnesota, South Dakota	1,551,000	1,627,000	562,000	499,000
West'n Missouri, Nebraska, Kansas, Oklahoma, Arkansas	*1,276,000	1,204,000	250,000	258,000
Texas	*712,000	653,000	268,000	279,000
Colorado, Montana, Utah, Wyoming and Idaho	263,000	291,000	314,000	302,000
California	1,020,000	861,000	1,060,000	1,016,000
Oregon and Washington	319,000	362,000	408,000	393,000
	15,165,000	14,587,000	7,009,000	7,852,000

EXPORTS AND IMPORTS OF HYDRAULIC CEMENT, BY MONTHS, IN 1929 AND 1930

Month	1929—Exports Barrels	Value	—1930 Barrels	Value	1929—Imports Barrels	Value	—1930 Barrels	Value
January	78,639	$283,002	82,387	$293,135	151,302	$177,976	201,609	$207,461
February	58,886	225,590	64,267	217,798	118,930	123,123	114,455	119,717
March	69,079	235,164	117,563	357,896	131,909	112,788	43,622	59,981
April	64,145	218,316	57,419	200,217	89,668	114,281	140,871	178,226
May	57,955	219,366	57,423	198,170	200,646	267,854	94,696	111,998
June	96,055	287,612	82,077	223,639	203,545	228,170	55,356	74,370
July	71,992	247.177	47,082	166,577	182,098	199,960	12,404	20,973
August	60,013	225.762	49,031	167,579	183,938	199,403	35,323	39,029
September	86,268	308,631	....	....	112,372	152,239	....	....
October	101,359	337,839	....	....	172,566	187,504	....	....
November	53,378	198,197	....	....	96,568	95,844	....	....
December	88,403	297,255	....	....	84,358	79,098	....	....
	886,172	$3,083,911	....	....	1,727,900	$1,938,240	....	....

Exports* and Imports†

These figures were compiled from the records of the Bureau of Foreign and Domestic Commerce and subject to revision.

EXPORTS OF HYDRAULIC CEMENT BY COUNTRIES IN AUGUST, 1930

Exported to	Barrels	Value
Canada	8,208	$24,521
Central America	2,194	7,321
Cuba	6,297	15,444
Other West Indies and Bermuda	3,968	7,729
Mexico	12,709	37,360
South America	11,390	51,788
Other countries	4,265	23,416
	49,031	$167,579

IMPORTS OF HYDRAULIC CEMENT BY COUNTRIES AND BY DISTRICTS, IN AUGUST, 1930

Imported from	District into which imported	Barrels	Value
Canada	Maine and N. H.	588	$ 1,554
	Vermont	7	18
	Total	595	$ 1,572
Denmark	Porto Rico	11,560	$13,512
Japan	Hawaii	783	$ 832
United K'gd'm	New York	1,010	$ 1,247
	Philadelphia	21,375	21,866
	Total	22,385	$23,113
	Grand total	35,323	$39,029

DOMESTIC HYDRAULIC CEMENT SHIPPED TO ALASKA, HAWAII AND PORTO RICO, IN AUGUST, 1930

	Barrels	Value
Alaska	2,657	$ 7,094
Hawaii	25,068	64,909
Porto Rico	5,378	10,706
	33,103	$82,709

*The value of exports of domestic cement is the actual cost at the time of exportation in the ports of the United States whence they are exported, as declared by the shippers on the export declarations.

†The value of imported cement represents the foreign market value at the time of exportation to the United States.

Retail Prices of Various Rock Products Materials

THE TABLE below gives average prices paid September 1, 1930, by contractors for various rock products, delivered on the job at different principal cities of the United States. These prices were secured through the Bureau of Census.

AVERAGE RETAIL PRICES FOR ROCK PRODUCTS MATERIALS, SEPTEMBER 1, 1930

City	Portland cement, per bbl. exclu. of cont.	Gypsum wallboard, 3/8-in., per M	Hydrated lime, per ton	Building sand, per cu. yd.	Crushed stone, 3/4-in., per ton	Gypsum plaster, neat, per ton
New Haven, Conn.	$2.90	....	$25.00	$1.50	$2.25	....
New London, Conn.	2.80	$25.00	26.00	1.50	2.40	$18.00
Waterbury, Conn.	3.00	30.00	20.00	1.35	2.45	20.00
Haverhill, Mass.	2.80	25.00	20.00	......	3.20	....
New Bedford, Mass.	2.60	27.00	18.50	1.75	3.00	17.50
Albany, N. Y.	2.97	24.75	18.00	......	......	17.10
Buffalo, N. Y.	2.95	21.00	18.00	2.50	2.05	16.00
Poughkeepsie, N. Y.	2.18	....	....	2.25	2.00	....
Rochester, N. Y.	3.25	22.00	22.00	1.75	2.40	17.00
Syracuse, N. Y.	3.00	22.50	18.00	2.00	2.25	17.00
Paterson, N. J.	2.60	25.00	18.00	1.50	2.10	17.50
Trenton, N. J.	2.40	26.00	18.00	1.50	2.10	17.50
Harrisburg, Penn.	2.65	27.00	16.00	3.10	1.50	18.50
Philadelphia, Penn.	2.30	....	15.50	1.85	2.65	19.75
Scranton, Penn.	2.80	....	20.00	3.25	......	19.00
Baltimore, Md.	2.40	....	13.00	2.25	2.75	16.00
Washington, D. C.	2.45	25.00	14.00	......	......	17.00
Richmond, Va.	3.10	31.00	17.50	1.95	2.45	20.00
Fairmount, W. Va.	2.80	35.00	16.00	3.15	3.50	18.00
Columbia, S. C.	3.00	....	12.50	1.50	2.50	14.40
Atlanta, Ga.	2.85	....	17.50	3.38	3.25	18.00
Savannah, Ga.	2.25	25.00	20.00	1.75	......	16.00
Birmingham, Ala.	3.00	....	....	2.50	1.75	15.00
Erie, Penn.	2.40	22.50	19.00	2.25	......	16.00
Akron, Ohio	$2.67	....	$18.00	$1.85	$2.75	....
Cincinnati, Ohio	2.94	$24.75	16.40	2.63	2.55	....
Cleveland, Ohio	2.80	22.00	14.00	1.95	2.70	$15.50
Columbus, Ohio	2.70	....	14.00	4.05	2.25	15.00
Youngstown, Ohio	2.95	....	18.00	3.71	2.75	15.00
Detroit, Mich.	2.60	21.00	14.80	2.75	3.00	....
Lansing, Mich.	2.75	....	22.00	2.25	2.25	16.00
Saginaw, Mich.	2.35	25.00	18.00	2.50	3.25	17.00
Terre Haute, Ind.	2.85	28.00	18.00	1.65	3.50	20.00
Louisville, Ky.	2.52	....	15.50	......	2.43	16.00
Chicago, Ill.	2.25	20.00	17.00	2.00	1.60	15.00
Milwaukee, Wis.	2.60	25.00	16.00	1.50	1.50	18.00
Des Moines, Iowa	2.66	23.75	20.00	1.60	3.60	10.00
Kansas City, Mo.	2.50	25.00	21.00	1.70	1.80	15.00
St. Louis, Mo.	2.45	....	18.00	1.49	1.75	18.00
St. Paul, Minn.	2.45	....	18.00	2.23	1.75	18.00
Grand Forks, N. D.	2.80	25.00	....	2.60	......	16.00
Sioux Falls, S. D.	3.00	....	24.00	1.25	2.25	15.00
San Antonio, Texas	2.60	....	20.00	2.10	2.35	19.15
Tucson, Ariz.	3.37	....	30.00	1.25	2.50	17.10
Los Angeles, Calif.	2.30	....	20.00	1.85	1.90	....
San Francisco, Calif.	2.34	....	22.50	1.40	1.60	17.90
Portland, Ore.	2.60	27.50	20.00	1.50	1.50	19.00
Seattle, Wash.	1.75	....	20.00	1.40	......	20.00

The Rock Products Market

Wholesale Prices of Sand and Gravel

Prices given are per ton, F.O.B., producing plant or nearest shipping point

Washed Sand and Gravel

City or shipping point	Fine Sand, 1/10 in. down	Sand, ¼ in. and less	Gravel, ½ in. and less	Gravel, 1 in. and less	Gravel, 1½ in. and less	Gravel, 2 in. and less
EASTERN:						
Attica and Franklinville, N. Y. (a)	.75	.75	.75	.75	.75	.75
Boston, Mass.‡	1.25	1.15	1.75	....	1.75	1.75
Buffalo, N. Y.	....	1.05	1.05	1.05	1.05	1.05
Erie, Penn.	.65	.95	1.25	1.25	....	....
Leeds Jct., Scarboro and South Portland Me., and Milton, N. H. (c)	....	.50	....	1.75	1.25	1.00
Machias Junction, N. Y.	.75	.75	....	....	.75	.75
Montoursville, Penn.	1.00	.75	.75	.60	.40	.40
Northern New Jersey	.18– .50	.18– .50	.50–1.25	.50–1.25	.50–1.25	....
Georgetown, D. C.	.55	.55	1.00	1.00	1.00	1.00
CENTRAL:						
Algonquin, Ill.	.30	.20	.20	.35	.35	.40
Attica, Ind.			All sizes .75–.85			
Cincinnati, Ohio	.55	.55	.80	.80	.80	.80
Columbus, Ohio	.75–1.00	.45– .75	.60– .75	.60– .75	.60– .75	.60– .75
Des Moines, Iowa	.40– .70	.40– .70	1.50–1.85	1.50–1.85	1.50–1.85	1.50–1.85
Dresden, Ohio	....	.60	.70– .80	.75	.75	.70
Eau Claire, Wis.	....	.40	.50	.85	.85	....
Elkhart Lake and Glenbeulah, Wis.	.40	.25	.50	.50	.45	.45
Grand Rapids, Mich.	.40	.40	.70	.70	.70	.70
Greenville, Ohio	.50– .70	.40– .60	.50– .60	.50– .60	.50– .60	.50– .60
Hamilton, Ohio	.65– .75	.65– .75	.65– .75	.65– .75	.65– .75	.65– .75
Hersey, Mich.	.50	....	....	.60	.70	.70
Kalamazoo, Mich.	....	.40– .50	....	.45– .55	....	.50– .75
Mankato, Minn.	.55	.45	1.25	1.25	1.25	1.25
Mason City, Iowa	.60	.60	1.25	1.25	1.25	1.25
Milwaukee, Wis.	....	.86	.86	.96	.96	.96
Minneapolis, Minn.	.35	.35	1.35	1.35	1.35	1.25
Oxford, Mich.	.25– .35	.20– .30	.30– .40	.55– .75	.55– .75	.60– .75
St. Paul, Minn.	.35	.35	1.25	1.25	1.25	1.25
Terre Haute, Ind.	.75	.60	.75	.75	.75	.75
Waukesha, Wis.	....	.45	.60	.60	.65	.65
Winona, Minn.	.40	.40	.50	1.00	1.00	1.00
SOUTHERN:						
Brewster, Fla.	.40	.40	....	....	....	....
Charleston, W. Va.	.70	1.25	1.25	....	....	....
Eustis, Fla.	....	.40– .50	....	....	....	....
Fort Worth, Tex.	1.00	1.00	1.00	1.25	1.25	1.25
Knoxville, Tenn.	.80	1.00	1.50	1.20	1.20	1.20
Roseland, La.	.15	.15	.60	.40	.40	....
WESTERN:						
Phoenix, Ariz.	1.25*	1.15*	1.25*	1.15*	1.15*	1.00*
Pueblo, Colo.	.80	.60	....	1.20	....	1.15
San Gabriel, San Fernando Valleys, Cal. (b)	.80	.80	1.30	1.30	1.30	1.30
Seattle, Wash.	1.00*	1.00*	1.00*	1.00*	1.00*	1.25*

*Cu. yd. ‡Delivered on job by truck. (a) Prices on trucks; on cars, 65c per ton for all sizes. (b) Discount, 20c per ton if paid by 10th of month following delivery. (c) In carload lots.

Core and Foundry Sands

Silica sand quoted washed, dried, screened unless otherwise stated; per ton f.o.b. plant.

City or shipping point	Molding, fine	Molding, coarse	Molding brass	Core	Furnace lining	Sand blast	Stone sawing
Albany, N. Y.	2.00	2.00	2.25	1.50	....	4.00	....
Cheshire, Mass.			Sand for soap, 5.75–7.00			5.00	....
Columbus, Ohio	1.50	1.50	1.35	.90	....	3.50–4.50	....
Dresden, Ohio	1.15–1.50	1.00–1.35	1.25–1.50	1.00–1.25	1.25	....	....
Eau Claire, Wis.	....	....	....	....	....	2.50–3.00	....
Elco, Ill.	Amorphous silica, 90-99½% thru 325 mesh, 10.00–60.00 per ton						
Kasota, Minn.	....	....	....	....	....	....	1.00
Montoursville, Penn.	....	....	....	1.35–1.50	....	....	....
New Lexington, Ohio	2.00	1.50	....	....	....	....	....
Ohlton, Ohio	1.75*	1.75*	1.75*	2.00*	1.75*	1.75*	....
Red Wing, Minn. (a)	....	....	....	....	1.50	3.00	1.50
San Francisco, Calif.	3.50†	5.00†	3.50†	2.50–3.50†	5.00†	3.50–5.00†	....
South Vineland, N. J.			Dry white silica sand, per ton, 2.25				

†Fresh water washed, steam dried. *Damp. (a) Filter sand, 3.00.

Miscellaneous Sands

City or shipping point	Roofing sand	Traction
Dresden, Ohio	....	1.00
Eau Claire, Wis.	4.30	1.00
Ohlton, Ohio	1.75	1.75
Red Wing, Minn.	....	1.00
San Francisco, Calif.	3.50	3.50

Glass Sand

(Silica sand is quoted washed, dried and screened)

Cheshire, Mass. (in carload lots)	5.00
Klondike, Mo.	2.00
Ohlton, Ohio	2.50
Red Wing, Minn.	1.50
South Vineland, N. J.	1.75
San Francisco, Calif.	4.00–5.00

Bank Run Sand and Gravel

Algonquin, Ill.¶ (½-in. and less)	.30
Buffalo, N. Y.—Sand, 1/10-in. down, 1.00; ¼-in. down, .85; gravel, all sizes	.75
Burnside, Conn. (sand, ¼-in. and less)	.75*
Fort Worth, Tex.¶ (2-in. and less)	.70
Gainesville, Tex.¶ (1½-in. and less)	.55
Grand Rapids, Mich.¶ (1-in. and less)	.50
Hersey, Mich.¶ ½-in. and less, .40; 1-in. and less	.50
Mankato, Minn.†	.70
Winona, Minn.—Sand, any size	.60
York, Penn.—Sand, 1/10-in. down, 1.10; ¼-in. and less	1.00

*Cu. yd. †Fine sand. 1/10-in. down. ¶Gravel.

ROCK PRODUCTS solicits volunteers to furnish accurate price quotations.

Portland Cement

	F.o.b. city named Per Bag	Per Bbl.	High Early Strength
Albuquerque, N. M.	.92½	3.70	......
Atlanta, Ga.	....	2.19*	3.49¶
Baltimore, Md.	....	2.26*	3.56¶
Birmingham, Ala.	....	1.85*	3.15¶
Boston, Mass.	.47	1.88*	3.27¶
Buffalo, N. Y.	.51¼	2.05*	3.35¶
Cedar Rapids, Ia.	....	2.23*	......
Charleston, S. C.	....	a2.29†	3.26¶
Cheyenne, Wyo.	.71½	2.86	......
Chicago, Ill.	....	1.95*	3.25¶
Cincinnati, Ohio	....	2.14*	3.44¶
Cleveland, Ohio	....	2.04*	3.34¶
Columbus, Ohio	....	2.17*	3.47¶
Dallas, Texas	....	1.90*	3.49¶
Davenport, Iowa	....	2.14*	......
Dayton, Ohio	....	2.14*	3.44¶
Denver, Colo.	.76¼	2.95	......
Des Moines, Iowa	.48½	2.29*	......
Detroit, Mich.	....	1.95*	3.25¶
Duluth, Minn.	....	2.04*	......
Houston, Texas	....	2.00*	3.73¶
Indianapolis, Ind.	.54¾	1.99*	3.29¶
Jackson Miss.	....	2.29*	3.59¶
Jacksonville, Fla.	....	*2.16–b2.34†	3.46¶
Jersey City, N. J.	....	2.13*	3.43¶
Kansas City, Mo.	.50½	2.02*	3.32¶
Los Angeles, Calif.	.57½	2.30	......
Louisville, Ky.	.55½	2.12*	3.42¶
Memphis, Tenn.	....	2.29*	3.59¶
Milwaukee, Wis.	....	2.10*	3.40¶
Minneapolis, Minn.	....	2.27*	......
Montreal, Que.	....	1.60‖	......
New Orleans, La.	....	1.92†	3.22¶
New York, N. Y.	.50¾	2.03*	3.33¶
Norfolk, Va.	....	1.97*	3.27¶
Oklahoma City, Okla.	.61½	2.46*	3.76¶
Omaha, Neb.	.59	2.36*	3.66¶
Peoria, Ill.	....	2.12*	......
Pittsburgh, Penn.	....	1.95*	3.25¶
Philadelphia, Penn.	....	2.15*	3.45¶
Portland, Ore.	....	2.50‡	......
Reno, Nev.	....	2.96‡	......
Richmond, Va.	....	2.32*	3.62¶
San Francisco, Calif.	....	2.24‡	......
Savannah, Ga.	....	a2.29†	......
St. Louis, Mo.	.48¾	1.95*	3.25¶
St Paul, Minn.	....	2.27*	
Seattle, Wash.	....	1.50	2.40c
Tampa, Fla.	....	2.00†	......
Toledo, Ohio	....	2.10*	3.50¶
Topeka, Kan.	.55¼	2.21*	3.51¶
Tulsa, Okla.	.58¼	2.33*	3.63¶
Wheeling, W. Va.	....	2.02*	3.32¶
Winston-Salem, N.C.	....	2.44*	3.74¶

Mill prices f.o.b. in carload lots, without bags, to contractors.

Albany, N. Y.	....	2.15	......
Bellingham, Wash.	....	2.25	......
Bonner Springs, Kan.	....	1.85	3.15¶
Buffington, Ind.	....	1.70	......
Concrete, Wash.	....	2.65	......
Hannibal, Mo.	....	1.80	......
Hudson, N. Y.	....	1.85	3.30¶
Independence, Kan.	....	1.85	......
Leeds, Ala.	....	1.70	......
Limedale, Ind.	....	1.70	......
Lime & Oswego, Ore.	....	2.50	......
Nazareth, Penn.	....	2.15	......
Northampton, Penn.	....	1.75	......
Richard City, Tenn.	....	2.05	......
Steelton, Minn.	....	1.85	......
Toledo, Ohio	....	2.20	......
Universal, Penn.	....	1.70	......
Waco, Tex.	....	1.85	......

NOTE: Unless otherwise noted, prices quoted are net prices, without charge for bags. Add 40c per bbl. for bags. *Includes dealer and cash discounts. †Includes 10c cash discount. ‡Subject to 2% cash discount. (a) 44c refund for paid freight bill. (b) 18c bbl. refund for paid freight bill. ¶"Incor" Perfected, prices per bbl. packed in paper sacks, subject to 10c discount 15 days. ‖Includes sales tax. (c) Quick-hardening "Velo."

Wholesale Prices of Crushed Stone

Prices given are per ton, F.O.B., producing plant or nearest shipping point

Crushed Limestone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
EASTERN:						
Buffalo, N. Y.	1.30	1.30	1.30	1.30	1.30	1.30
Chazy, N. Y.	.75	1.60	1.60	1.30	1.30	1.30
Farmington, Conn. (a)	1.00	1.30	1.30	1.00	1.00	....
Ft. Spring, W. Va.	.35	1.35	1.35	1.25	1.15	1.00
Oriskany Falls, N. Y.	.85–1.00	1.00–1.35	1.00–1.35	1.00–1.35	1.00–1.35	1.00–1.35
Prospect Junction, N. Y.	.50– .80	....	1.00–1.15	1.00–1.10	1.00–1.10	....
Rochester, N. Y.—Dolomite	1.50	....	....	....	....	....
Hillsville, Penn.	.85	1.35	1.35	1.35	1.35	1.35
Western New York	.85	1.25	1.25	1.25	1.25	1.25
CENTRAL:						
Alton, Ill.	1.75	....	1.75	....	....	....
Afton, Mich.	....	....	....	.25	....	1.50
Cypress, Ill.	1.25	.90	.90	.90	.85	.85
Dubuque, Iowa	1.00	1.00	1.00	1.00	1.00	....
Stolle and Falling Springs, Ill.	1.05–1.70	.95–1.70	1.15–1.70	1.05–1.70	1.05–1.70	....
Greencastle, Ind.	1.25	1.00	.90	.90	.90	.90
Lannon, Wis.	.80	.80	.80	.80	.80	.80
Sheboygan, Wis.	1.20	1.20	1.10	1.10	....	....
Stone City, Iowa	.75	....	1.10	1.00	1.00	1.00h
Toledo, Ohio	1.60	1.70	....	1.60	....	1.60
Toronto, Canada	2.25	2.75	2.25	2.25	....	2.25
Waukesha, Wis.	.90	.90	.90	.90	.90	....
SOUTHERN:						
Bridgeport, Chico and Knippa, Texas	1.00–1.10	1.25–1.30	1.20–1.25	1.15–1.20	1.10–1.15	1.05–1.10
El Paso, Texas	.50– .75	1.25	1.25	1.00	1.00	1.00
Olive Hill, Ky.	.50–1.00	1.00	1.00	.90	.90	.90
WESTERN:						
Atchison, Kan.	.50	1.80	1.80	1.80	1.80	1.70
Blue Springs and Wymore, Neb. (t)	.25	.25	1.45	1.35c	1.25d	1.20
Cape Girardeau, Mo.	1.00	1.25	1.25	1.25	1.00	....
Rock Hill, St. Louis Co., Mo.	1.30–1.40	1.30–1.40	1.10–1.40	1.30–1.40	1.30–1.40	1.30–1.40
Stringtown, Okla.	1.00–1.10	1.25–1.30	1.20–1.25	1.15–1.20	1.10–1.15	1.05–1.10

Crushed Trap Rock

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Birdsboro, Penn.	1.20	1.60	1.45	1.35	....	1.30
Branford, Conn.	.80	1.70	1.45	1.20	1.05	....
Bridgeport, Chico and Knippa, Texas	2.25–2.50	1.80–2.00	1.50–1.60	1.30–1.40	1.20–1.30	1.00–1.25
Duluth, Minn.	1.00	2.25	1.75	1.65	1.35	1.25
Eastern Maryland	1.00	1.60	1.60	1.50	1.35	1.35
Eastern Massachusetts	.85	1.75	1.75	1.25	1.25	1.25
Eastern New York	.75	1.25	1.25	1.25	1.25	1.25
Eastern Pennsylvania	1.10	1.70	1.60	1.50	1.35	1.35
New Britain, Plainville, Rocky Hill, Wallingford, Meriden, Mt. Carmel, Conn.	.80	1.70	1.45	1.20	1.05	....
Northern New Jersey	1.35–1.50	1.40–2.10	1.40–1.90	1.30–1.50	1.30–1.50	....
Richmond, Calif.	.75	1.00	1.00	1.00	1.00	....
Stringtown, Okla.	2.25–2.50	1.80–2.00	1.50–1.60	1.30–1.40	1.20–1.30	1.00–1.25
Toronto, Canada	....	5.30	3.70	....	....	....
Westfield, Mass.	.60	1.50	1.35	1.20	1.10	....

Miscellaneous Crushed Stone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Cayce, S. C.—Granite	....	....	1.60	1.60	1.50	....
Eastern Pennsylvania—Sandstone	1.35	1.70	1.65	1.40	1.40	1.40b
Eastern Pennsylvania—Quartzite	1.20	1.35	1.25	1.20	1.20	1.20
Lithonia, Ga.—Granite	.50	1.25	1.25	1.15	1.15	....
Lohrville, Wis.—Granite	1.80	1.60	....	1.50	1.50	....
Middlebrook, Mo.—Granite	3.00–3.50	....	2.00–2.25	2.00–2.25	....	1.25–3.00
San Gabriel and San Fernando Valleys, Calif. (Granite)	....	1.30	1.30	1.30	....	1.30
(Basalt)	....	....	....	.85	....	....
Toccoa, Ga.—Granite	.50	....	1.30	1.25	1.20	1.15

(a) Stone 1-in., 1.10 per net ton. (b) Ballast. (c) 1-in., 1.40. (d) 2-in., 1.30. (h) Rip rap. (n) Ballast, R. R., .90; run of crusher, 1.00. (r) Cu. yd. (t) Rip rap, 1.20–1.40 per ton.

Crushed Slag

City or shipping point	Roofing	¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
EASTERN:							
Bethlehem, Penn.	1.25–1.50	.50– .60	1.00	.60– .80	.70– .80	.70– .90	.90
Buffalo, N. Y., Erie and Du Bois, Penn.	2.25	1.25	1.25	1.35	1.25	1.25	1.25
Western Pennsylvania	2.00	1.25	1.25	1.25	1.25	1.25	1.25
CENTRAL:							
Ironton, Ohio	2.05*	1.30*	1.80*	1.45*	1.45*	1.45*	....
Jackson, Ohio	2.05*	.65*	1.80*	1.30*	1.30*	1.30*	....
Toledo, Ohio	1.50	1.10	1.35	1.35	1.35	1.35	1.35
SOUTHERN:							
Ashland, Ky.	2.05*	1.05*	1.65*	1.45*	1.45*	1.45*	....
Ensley and Alabama City, Ala.	2.05	.55	1.25	1.15	.90	.90	.80
Longdale, Va.	2.50	1.00	1.25	1.25	1.25	1.15	1.05
Woodward, Ala.†	2.05*	.55*	....	1.15*	.90*	.90*	....

5c per ton discount on terms. †1½-in. to ¼-in., 1.05; ⅝-in. to 10 mesh, 1.25*; ⅝-in. to 0-in., 90c*; ¼-in. to 10 mesh, .80*.

Agricultural Limestone
(Pulverized)

Alton, Ill.—Analysis, 99% $CaCO_3$; 0.3% $MgCO_3$, 90% thru 100 mesh	4.00
Cape Girardeau, Mo.—Analysis, $CaCO_3$, 94½%; $MgCO_3$, 3½%; 90% thru 50 mesh	1.50
Davenport, Iowa — Analysis, 92-98% $CaCO_3$; 2% and less $MgCO_3$; 100% thru 20 mesh, 50% thru 200 mesh; sacks, per ton	6.00
Gibsonburg, Ohio—Bulk, 2.25; in bags	3.70
Jamesville, N. Y.—Bulk, 3.50; in 80-lb. bags	4.75
Knoxville, Tenn.—Analysis, 52% $CaCO_3$; 36% $MgCO_3$; 80% thru 100 mesh, bags, 3.75; bulk	2.50
Marion, Va.—Analysis, 90% $CaCO_3$, 2% $MgCO_3$; per ton	2.00
Middlebury, Vt.—Analysis, 99.05% $CaCO_3$; 90% thru 50 mesh	4.25
West Rutland, Vt. — Analysis, 96.5% $CaCO_3$; 1% $MgCO_3$, in 100-lb. burlap bags, per ton	4.50

Agricultural Limestone
(Crushed)

Bedford, Ind.—Analysis, 98.44% $CaCO_3$; .83% $MgCO_3$; 90% thru 10 mesh	1.50
Colton, Calif.—Analysis, 95-97% $CaCO_3$; 1.31% $MgCO_3$, all thru 14 mesh down to powder	3.50
Cypress, Ill. — Analysis, 96% $CaCO_3$; 90% thru 100 mesh, 1.25; 50% thru 100 mesh, 1.25; 90% thru 50 mesh, 1.25; 50% thru 50 mesh, 1.25; 90% thru 4 mesh, 1.25, and 50% thru 4 mesh	1.25
Davenport, Iowa — Analysis, 92-98% $CaCO_3$; 2% and less $MgCO_3$; 100% thru 4 mesh, 50% thru 20 mesh; bulk, per ton	1.00
Dubuque, Ia.—Analysis, 64.04% $CaCO_3$; 29.54% $MgCO_3$; 50% thru 100 mesh	1.10
Fort Spring, W. Va.—Analysis, 90% $CaCO_3$; 3% $MgCO_3$; 50% thru 100 mesh; bulk, per ton	1.15
Gibsonburg, Ohio—90% thru 10 mesh	1.00–1.50
Hillsville, Penn.—Analysis, 94% $CaCO_3$; 1.40% $MgCO_3$; 75% thru 100 mesh, sacked	5.00
Lannon, Wis. — Analysis, 54% $CaCO_3$, 44% $MgCO_3$; 99% thru 10 mesh; 46% thru 60 mesh	2.00
Screenings (¼-in. to dust)	1.00
Marblehead, Ohio—90% thru 100 mesh	3.00
90% thru 50 mesh	2.00
90% thru 4 mesh	1.00
Marlbrook, Va.—Precipitated lime-marl. Analysis, 96% $CaCO_3$; 1% $MgCO_3$, 90% thru 50 mesh, bulk, 2.25; in burlap bags	3.75
Olive Hill, Ky.—90% thru 4 mesh, per ton	1.00
Branchton, Penn.—100% thru 20 mesh, 60% thru 100 mesh, and 45% thru 200 mesh, per ton	a5.00
Piqua, Ohio—30%, 50% and 99% thru 100 mesh	1.00–4.00
Stolle and Falling Springs, Ill.—Analysis, 89.9% $CaCO_3$, 3.8% $MgCO_3$; 90% thru 4 mesh	1.25–1.70
Stone City, Ia.—Analysis, 98% $CaCO_3$; 50% thru 50 mesh	.75
West Stockbridge, Mass.* — Analysis, 95% $CaCO_3$; 90% thru 100 mesh, bulk	3.50
100-lb. paper bags, 4.75; 100-lb., cloth	5.25
Waukesha, Wis.—90% thru 100 mesh, 4.00; 50% thru 100 mesh	2.10

*Less 25c cash 15 days. (a) Less 50c comm.

Pulverized Limestone for Coal Operators

Davenport, Iowa—Analysis, 97% $CaCO_3$; 2% and less $MgCO_3$; 100% thru 20 mesh, 50% thru 200 mesh; sacks, ton	6.00
Joliet, Ill.—Analysis, 48% $CaCO_3$; 42% $MgCO_3$; 90% thru 200 mesh (bags extra)	3.50
Piqua, Ohio—99% thru 100 mesh, bulk, 3.25; in 80-lb. or 100-lb. bags	4.25
Rocky Point, Va.—Analysis, 97% $CaCO_3$; 75% $MgCO_3$; 85% thru 200 mesh, bulk	2.25–3.50
Waukesha, Wis.—90% thru 100 mesh, bulk	4.00

Lime Products

(Carload prices per ton f.o.b. shipping point unless otherwise noted)

	Finishing hydrate	Masons' hydrate	Agricultural hydrate	Chemical hydrate	Ground burnt lime, Bulk	Ground burnt lime, Bags	Lump lime In bulk	Lump lime In bbl.
EASTERN:								
Berkeley, R. I.			11.40			17.50		20.65
Cedar Hollow, Devault, Mill Lane, Knickerbocker, Rambo and Swedeland, Penn.		9.50b	9.50b	9.50b	8.00f	9.50d	8.50	
Lime Ridge, Penn.			7.50		6.50	8.00[1]	4.50	
CENTRAL:								
Afton, Mich.						10.50	6.50	
Cold Springs, Ohio		7.75	7.75				7.00	
Gibsonburg, Ohio	10.50	7.75	7.75		7.00	9.00[3]	7.00	
Marblehead, Gibsonburg, Tiffin, O., and Huntington, Ind.	10.50	7.75	7.75	11.00	7.00	9.00	7.00	
Milltown, Ind.		9.00	8.25	9.50	7.50		7.00	
Scioto, Ohio	10.50	6.50	6.50	7.50			7.00	15.00
Sheboygan, Wis.		10.50	10.50	10.50			9.50	20.00e
Woodville, Ohio	7.75	6.00	6.00	9.00	6.00	8.00	6.00	15.00c
SOUTHERN:								
Keystone, Ala.	17.00	7.00		7.00– 8.00	5.00g	11.55	5.00a	12.65
Knoxville, Tenn.					5.50	11.55	5.00	12.65
Ocala, Fla.		11.00	11.00					
Pine Hill, Ky.		9.00	8.00	7.50–9.00			6.00	12.50
WESTERN:								
Kirtland, N. M.							15.00	
Los Angeles, Calif.	22.00	18.00	18.00	18.00	19.00		19.00	21.00
San Francisco, Calif.†	20.00	20.00	12.00	20.00				
San Francisco, Calif.	19.00	14.00–17.00	12.50	14.00–19.00	14.50[5]		11.00[4]	

[1]In 100-lb. bags. [4]To 14.50. [5]Also 13.00. *Price to dealers. †Wood-burnt lime: finishing hydrate, 20.00 per ton; pulv. lime, 2.00 per iron drum. Oil-burnt pulv. lime, 13.00–14.50 per ton. (a) To 7.00. (b) In 50-lb. paper. (c) In wood; in steel, 16.00. (d) In 80-lb. paper bags. (e) In steel. (f) For chemical purposes. (g) To 7.00.

Wholesale Prices of Slate

Prices given are f.o.b. at producing point or nearest shipping point

Slate Flour

Pen Argyl, Penn.—Screened, 200 mesh, 7.00 per ton in paper bags.

Slate Granules

Esmont, Va.—Blue, $7.50 per ton. Granville, N. Y.—Red, green and black, $7.50 per ton.
Pen Argyl, Penn.—Blue-grey, 6.50 per ton in bulk, plus 10c per bag.

Roofing Slate

City or shipping point	Prices per square—Standard thickness 3/16-in.	¼-in.	⅜-in.	½-in.	¾-in.	1-in.
Bangor, Penn.—						
Gen. Bangor No. 1 clear	10.00–14.00	20.00	25.00	29.00	40.00	50.00
Gen. Bangor No. 1 ribbon	9.00–10.25	16.00	20.00	25.00	35.00	46.00
No. 1 Albion	7.25–10.50	16.00	23.00	27.00	37.00	46.00
Gen. Bangor No. 2 ribbon	6.75– 7.25					
Granville, N. Y.—						
Sea green, weathering	14.00	24.00	30.00	36.00	48.00	60.00
Semi-weathering, green & gray	15.40	24.00	30.00	36.00	48.00	60.00
Mottled purple & unfading gr'n	21.00	24.00	30.00	36.00	48.00	60.00
Red	27.50	33.50	40.00	47.50	62.50	77.50
Pen Argyl, Penn.						
Graduated slate		16.00	23.00	27.00	37.00	46.00
No. 1 clear (smooth text)	7.25–10.50; Albion-Bangor medium, 8.00–9.00; No. 1 ribbon, 8.00–8.50					

(a) Prices are for standard preferred sizes (standard 3/16-in. slates), smaller sizes sell for lower prices.
(b) Prices other than 3/16-in. thickness include nail holes.
(c) Prices for punching nail holes, in standard thickness slates, vary from 50c to $1.25 per square.

Talc

Prices given are per ton f.o.b. (in carload lots only), producing plant, or nearest shipping point.

Chatsworth, Ga.:
- Crude talc, per ton 5.00
- Ground talc (20-50 mesh), bags 6.50
- Ground talc (150-200 mesh), bags 9.00
- Pencils and steel crayons, gross 1.50– 2.00

Chester, Vt.—Finely ground talc (carloads), Grade A—99-99¾% thru 200 mesh, 8.00–8.50; Grade B, 97-98% thru 200 mesh 7.50– 8.00
1.00 per ton extra for 50-lb. paper bags; 166⅔-lb. burlap bags, 15c each; 200-lb. burlap bags, 18c each. Credit for return of bags. Terms 1%, 10 days.

Emeryville, N. Y.:
- Ground talc (200 mesh), bags 13.75
- Ground talc (325 mesh), bags 14.75

Hailesboro, N. Y.:
- Ground talc (300-350 mesh), in 200-lb. bags 15.00–20.00

Henry, Va.:
- Crude (mine run), bulk 3.50– 4.50
- Ground talc (150-200 mesh) in bags 6.25– 9.50

Joliet, Ill.:
- Ground talc (200 mesh), in bags:
- California talc 30.00
- Southern talc 20.00
- Illinois talc 10.00

Los Angeles, Calif.:
- Ground talc (150-200 mesh), in bags 15.00–25.00

Natural Bridge, N. Y.:
- Ground talc (325 mesh), bags 10.00–15.00

Rock Phosphate

Prices given are per ton (2240 lb.) f.o.b. producing plant or nearest shipping point.

Lump Rock

Gordonsburg, Tenn.—B.P.L. 65-70% 3.50– 4.00
Mt. Pleasant, Tenn.—B.P.L. 76-78% 6.75

Ground Rock

(2000 lb.)

Gordonsburg, Tenn.—B.P.L. 65-68% 3.50– 4.00
Mt. Pleasant, Tenn.—B.P.L. 74.4%, without bags 11.80
In paper bags, 13.80; in cotton bags 15.30
Mt. Pleasant, Tenn.—B.P.L. 72% 5.00– 5.50

Florida Phosphate

(Raw Land Pebble)

Mulberry, Fla.—Gross ton, f.o.b. mines
- 68/66% B.P.L. 3.15
- 70% minimum B.P.L. 3.75
- 72% minimum B.P.L. 4.25
- 75/74% B.P.L. 5.25
- 77/76% B.P.L. 6.25

Mica

Prices given are net, f.o.b. plant or nearest shipping point.

Rumney Depot, Bristol and Cardigan, N. H.—Per ton:
- Punch mica, per ton 150.00–240.00
- Mine scrap 22.50
- Mine run 325.00
- Clean shop, scrap 25.00
- Roofing mica 37.50
- Trimmed mica, per ton, 20 mesh, 37.50; 40 mesh, 40.00; 60 mesh, 40.00; 100 mesh, 45.00; 200 mesh 60.00

Spruce Pine, N. C.—Mine scrap, per ton 18.00– 20.00
Trenton, N. J.—Mine scrap, per ton, f.o.b. mines 18.00

Gypsum Products—CARLOAD PRICES PER TON AND PER M SQUARE FEET, F.O.B. MILL

East St. Louis, Ill.—Special Gypsum Products—Partition section, 4 in. thick, 12 in. wide, and up to 10 ft. 3 in. long, 12c per ft., 21.00 per ton; outside wall section and interior bearing wall section, 6 in. wide, 6 in. thick, and up to 10 ft. 3 in. long, 25c per ft., 30.00 per ton; floor section, 7 in. thick, 16 in. wide, and up to 13 ft. 6 in. long, 17c per ft., 23.00 per ton.

City or shipping point	Crushed Rock	Ground Gypsum	Agricultural Gypsum	Stucco Calcined Gypsum	Cement and Gaging Plaster	Wood Fiber	Gaging White	Plaster Sanded	Cement Keene's	Finish Trowel	—Plaster Board— ¼x32x 36". Per M Sq. Ft.	—Plaster Board— ⅜x32x 36". Per M Sq. Ft.	Wallboard, ⅜x32 or 48" Lengths 6'-10'. Per M Sq. Ft.
Grand Rapids, Mich.				9.00	9.00	9.00					15.00	15.00	27.00
Los Angeles, Calif.	3.90	10.00	7.00–10.00	8.20	11.70		11.50	10.50	40.00	10.50		22.00	35.00
Medicine Lodge, Kan.	1.40						11.50d		16.00d				
San Francisco, Calif.		10.20d			12.90		13.90						
Winnipeg, Man.	5.00	5.00	7.00	13.00	14.00	14.00					20.00	25.00g	33.00f

NOTE—Returnable bags, 10c each; paper bags, 1.00 per ton extra (not returnable). (d) Includes paper bags. (e) Includes jute sacks. (f) "Gyproc," ⅜x48-in. by 5 and 10 ft. long. (g) ⅜x48-in. by 3 to 4 ft. long. (y) Jute sacks, 18.00; paper sacks, 16.00.

Special Aggregates

Prices are per ton f.o.b. quarry or nearest shipping point.

City or shipping point	Terrazzo	Stucco-chips
Brandon, Vt.—English pink, cream and coral pink	¶12.50–‖14.50	¶12.50–‖14.50
Cranberry Creek, N. Y.—Bio-Spar, per ton in bags in carload lots, 9.00; less than carload lots, per ton in bags		12.00
Crown Point, N. Y.—Mica Spar	....	¶9.00–‖12.00
Davenport, Iowa — White limestone, in bags, per ton	‖6.00	‖6.00
Middlebrook, Mo.—Red	....	20.00–25.00
Middlebury, Vt. — Middlebury white	....	¶9.00–‖10.00
Middlebury and Brandon, Vt.—Caststone, per ton, including bags	....	c5.50
Phillipsburg, N. J.—Royal green granite, in bags, per ton	15.00–18.00	....
Stockton, Calif.—"Nat-rock" roofing grits	....	12.00–20.00
Tuckahoe, N.Y.—Tuckahoe white	7.00	....
Warren, N. H. (d)	....	¶8.00– 8.50

¶C.L. ‖L.C.L. (a) Including bags. (b) In burlap bags, 2.00 per ton extra. *Per 100 lb. (c) Per ton f.o.b. quarry in carloads; 7.00 per ton L.C.L. (d) L.C.L., 9.50–15.00 per ton in 100-lb. bags.

Soda Feldspar

De Kalb Jct., N. Y.—Color, white; pulverized (bags extra, burlap 2.00 per ton, paper 1.20 per ton); 99% thru 140 mesh, 16.00; 99% thru 200 mesh, per ton	18.00

Potash Feldspar

Bedford, Va.—Color, white; analysis, K_2O, 12.5%; Na_2O, 2%; SiO_2, 66.5%; Fe_2O_3, 0.08-0.12%; Al_2O_3, 18.5%, crude feldspar, bulk	6.50– 7.50
Keystone, S. D.—Color, white; analysis, K_2O, 12.50%; NaO, 2.25%; SiO_2, 64%; Fe_2O_3, 0.03%; Al_2O_3, 20%, pulverized, 99% thru 200 mesh; in bags, 16.00; bulk	15.00
Crude, in bags, 7.50; bulk	6.50
East Liverpool, Ohio — Color, white; analysis, K_2O, 11.00%; Na_2O, 2.25%; SiO_2, 68.00%; Fe_2O_3, .08%; Al_2O_3, 17.95%, pulverized, 99% thru 200 mesh, in bags, 22.00; in bulk	20.00
Erwin, Tenn.—White: analysis, K_2O, 10.50%; Na_2O, 2.75%; SiO_2, 67.75%; Fe_2O_3, .08%; Al_2O_3, 18.00%, pulverized, 98% thru 200 mesh, in bags, 16.00; bulk	15.00
Crude, in bags, 7.50; bulk	6.50

Cement Drain Tile

Graettinger, Iowa — Drain tile, per foot; 5-in., .04½; 6-in., .05½; 8-in., .09; 10-in., .12½; 12-in., .17½; 15-in., .35; 18-in., .50; 20-in., .60; 24-in., 1.00; 30-in., 1.35; 36-in.	2.00
Grand Rapids, Mich.—Drain tile, per 1000 ft.	
4-in.	36.00
6-in.	66.00
8-in.	100.00
10-in.	150.00
12-in.	210.00
Longview, Wash.—Drain tile, per 100 ft.	
3-in.	5.00
4-in.	6.00
6-in.	10.00
8-in.	15.00

Chicken Grits

Cypress, Ill.—(Agstone)	1.15
Chico, Tex.—Hen size and Baby Chick, packed in 100-lb. sacks, per 100-lb. sack, f.o.b. Chico	1.00
Davenport, Iowa—High calcium carbonate limestone, in bags, L.C.L., per ton	6.00
El Paso, Tex.—(Limestone), per 100-lb. sack	.75
Los Angeles, Calif.—(Gypsum), per ton, including sacks	7.50– 9.50
Middlebury, Vt.—Per ton (a)	10.00
Piqua, Ohio—(Pearl grit), No. 1 and No. 2	1.00– 4.00
Port Clinton, Ohio—(Gypsum), per ton	6.00
Warren, N. H.	8.50– 9.50
Waukesha, Wis.—(Limestone), per ton	7.00
West Stockbridge, Mass.	¶7.50–‖9.00

(a) F.o.b. Middlebury, Vt. ¶C.L. ‖L.C.L.

Sand-Lime Brick

Prices given per 1000 brick f.o.b. plant or nearest shipping point, unless otherwise noted.

Barton, Wis. (at plant)	9.50
Dayton, Ohio	12.50–13.50
Detroit, Mich.	12.00¶–15.50*
Flint, Mich.	15.50‡
Grand Rapids, Mich.	14.00
Iona, N. J.	10.50–12.00
Jackson, Mich.	13.00
Madison, Wis.	12.50†
Milwaukee, Wis.	12.00–13.00*
Minneapolis and St. Paul, Minn.	9.50*
Mishawaka, Ind.	11.00
New Brighton, Minn.	9.00
Pontiac, Mich.	10.00–11.00
Saginaw, Mich.	13.50
Sebewaing, Mich. (at yard)	12.50
Syracuse, N. Y.	18.00–20.00
Toronto, Canada	11.00–‡13.00*
Wilkinson, Fla.—White, 10.00; buff	14.00
Winnipeg, Canada	15.00

*Delivered on job. †Less 50c dis. per M 10th of month. ‡5% disc., 10 days. §Delivered in city. ¶To 13.00.

Concrete Block

Prices given are net per unit, f.o.b. plant or nearest shipping point.

City or shipping point	Size 8x8x16
Camden, N. J.: 8x8x16, each	.18
Chicago, Ill.:	
8x 8x16. Each	.21a
8x12x16. Each	.28a
Columbus, Ohio: 8x8x16	14.00§–16.00‡
Graettinger, Iowa	.18– .20
Indianapolis, Ind.	.10– .12‡
Lexington, Ky.:	
8x8x16	‡18.00*
8x8x16	§16.00*
Los Angeles, Calif.:	
4x8x12	4.50*
4x6x12	3.90*
4x4x12	2.90*

*Price per 100 at plant.
†Rock or panel face.
‡Face. §Plain. (a) Rock face.

Cement Roofing Tile

Prices are net per square, carload lots, f.o.b. nearest shipping point, unless otherwise stated.

Cicero, Ill.—French, Spanish, Closed End Shingle, and English Shingle, per sq.	9.50–13.00
Indianapolis, Ind.—9x15-in.	Per sq.
Gray	10.00
Red	11.00
Green	13.00
Lexington, Ky.—8x15, per sq.:	
Red	15.00
Green	18.00
Longview, Wash.:	
4x6x12-in., per 1000	55.00
4x8x12-in., per 1000	65.00

Cement Building Tile

Chicago District (Haydite):	
8x 4x16, per 1000	140.00
8x 8x16, per 1000	200.00
8x12x16, per 1000	300.00
Lexington, Ky.:	
5x8x12, per 1000	55.00
4x5x12, per 1000	35.00
Longview, Wash. (Stone Tile):	
4x6x12, per 1000	57.50
4x8x12, per 1000	65.00

Concrete Brick

Prices given per 1000 brick, f.o.b. plant or nearest shipping point.

	Common	Face
Camden & Trenton, N. J.	17.00	....
Chicago District "Haydite"	14.00	....
Ensley, Ala. ("Slagtex")	10.00a	....
Longview, Wash.	16.50	23.00– 40.00
Milwaukee, Wis.	14.00	....
Omaha, Neb.	18.00	30.00– 40.00
Prairie du Chien, Wis.	14.00	22.50– 25.00
Rapid City, S. D.	16.00	30.00

(a) 13.00 delivered on job in city.

Fullers Earth

Prices per ton in carloads, f.o.b. Florida shipping points. Bags extra and returnable for full credit.

16– 30 mesh	20.00
30– 60 mesh	22.00
60–100 mesh	18.00
100 mesh and finer	9.00
Joliet, Ill.—All passing 100 mesh. Price per ton, f.o.b. Joliet, including cost of bags	24.00

Stone-Tile Hollow Brick

Prices are net per thousand, f.o.b. plant.

	No. 4	No. 6	No. 8
Albany, N. Y.*†	40.00	60.00	70.00
Asheville, N. C.	35.00	50.00	60.00
Atlanta, Ga.	29.00	42.50	53.00
Brownsville, Tex.	......	53.00	62.50
Brunswick, Me.†	40.00	60.00	80.00
Charlotte, N. C.	35.00	45.00	60.00
De Land, Fla.	30.00	50.00	60.00
Farmingdale, N. Y.	37.50	50.00	60.00
Houston, Tex.	35.00	45.00	60.00
Jackson, Miss.	45.00	55.00	65.00
Klamath Falls, Ore.	65.00	75.00	85.00
Longview, Wash.		55.00	64.00
Los Angeles, Calif.	29.00	39.00	45.00
Mattituck, N. Y.	45.00	55.00	65.00
Medford, Ore.	50.00	55.00	70.00
Memphis, Tenn.	50.00	55.00	65.00
Mineola, N. Y.	45.00	50.00	60.00
Nashville, Tenn.	30.00	49.00	57.00
New Orleans, La.	35.00	45.00	60.00
Norfolk, Va.	35.00	50.00	65.00
Passaic, N. J.	40.00	52.50	70.00
Patchogue, N. Y.	......	60.00	70.00
Pawtucket, R. I.	35.00	55.00	75.00
Safford, Ariz.	32.50	48.75	65.00
Salem, Mass.	40.00	60.00	75.00
San Antonio, Tex.	37.00	46.00	60.00
San Diego, Calif.	35.00	44.00	52.50

Prices are for standard sizes—No. 4, size 3½x4x12 in.; No. 6, size 3½x6x12 in.; No. 8, size 3½x8x12 in. *Delivered on job. †10% discount.

Current Prices Cement Pipe

Prices are net per foot f.o.b. cities or nearest shipping point in carload lots unless otherwise noted

Culvert and Sewer	4-in.	6-in.	8-in.	10-in.	12-in.	15-in.	18-in.	20-in.	22-in.	24-in.	27-in.	30-in.	36-in.	42-in.	48-in.	54-in.	60-in.
Grand Rapids, Mich. (b)																	
Sewer	......	.12	.18	.27⅓	.35	.47	.92½	1.11	......	1.66½	2.47	2.73⅔	......	......	......	......	......
Culvert	......	......	......	.57	.67	.93	1.20	......	......	1.80	2.10	2.25	3.35	4.00	5.60	6.90	7.85
Indianapolis, Ind. (a)	......	......	......	.75	.85	.90	1.15	......	......	1.60	......	2.50	......	......	......	......	......
Newark, N. J. (d)	......	......	......	......	.90	1.15	1.50	......	......	1.85	2.35	2.76	3.77	4.93	6.21	7.66	9.28
Unreinforced	......	.16	.25	.37	......	......	......	......	......	......	......	......	......	......	......	......	......
Norfolk, Neb.	......	......	......	.90	1.00	1.13	1.42	......	......	2.11	......	2.75	3.58	......	6.14	......	7.78
Wahoo, Neb. (c)	......	......	......	......	.85½	......	1.14	......	......	1.81	......	2.47	3.42	4.13	5.63	6.49	7.31

(a) 24-in. lengths. †21-in. diam. (c) Reinforced, 15.40 per ton, f.o.b. plant. (d) Reinforced, 21-in., 1.69; unreinforced, 21-in., 1.26; 5% cash discount.

Cement Products

TRADE MARK REGISTERED WITH U. S. PATENT OFFICE

Trend in Designs on Cement Products

Part V—The Status of Design in Cement Craft Is Something Those Who Create Must Study

By George Rice
Palo Alto, Calif.

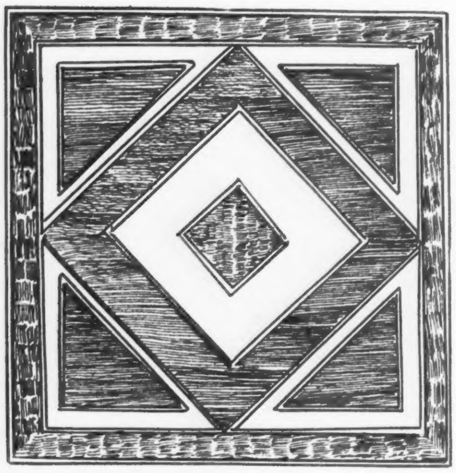


Fig. 1. Design lacking in variation because of equal measurements

ANYTHING THAT WILL assist those who create, who merchandise or who simply analyze and report on conditions in any industry is appreciated and taken advantage of by all concerned. Just now the status of design in cement craft is interesting those who are producing and selling cement ware in which ornamentation appears. Because of the possibilities in design technique a great many laboratories throughout the land are experimenting with the plan of merchandising rock products in new channels. Because of the selling power of modernistic design on cement commodities, the field for their distribution has been widened.

Fig. 2. Greater variation possible in design where measure is unequal

Few members of the trade supposed that there would be much of a demand for picturesque plaques from show window trimmers. Attractive facsimiles of portraits of famous men, wood scenes, racing scenes and various other paintings have been made on cardboard, metal, wood and canvas, in oil and water colors, by the show card writers and exhibited in windows for publicity purposes.

The paintings draw the attention of the people to the merchandise displayed and often lure the prospective customer into the store to make a purchase. All of which is legal and proper. But there is a drawing power in a cast, molded or incised cement plaque which does not exist in a painting, if the object which is presented and the design effects are properly expressed.

In passing some of the best equipped, best lighted and best trimmed show windows of the large stores we notice that the ordinary hand or machine printed or painted plaque has been replaced in many instances with the more substantial, more distinct and certainly more attractive cement plaque on which appears the profile of a noted individual or a scene or just a conventional design.

Variation in Cement Designing Is One of the Motivating Stimulants

Regardless of whether the designs are for plaques to be seen, tile to be walked upon or to have a position in the architectural structure of a great building, the element of variation cannot be passed over lightly. The craftsman has to be about as particular with the variation of the parts composing his design as with the balance and unity of those parts. This variation cannot be had by simply mixing geometrical, conventional or naturalistic motifs together in a single design. The element of measure comes in, for measure governs the contours of the forms and motifs employed in the design.

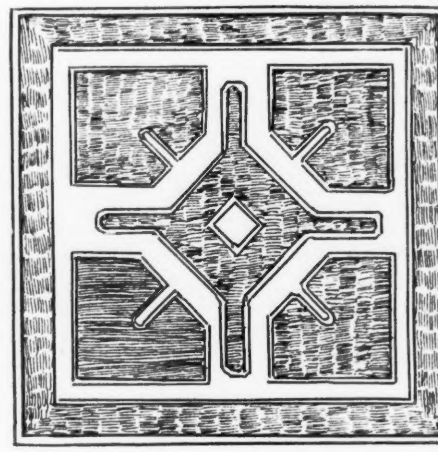


Fig. 3. Conventional design in color. Set forms and dignified treatment

There is not much variation visible in a design built up with its parts quite equal in measure as shown in Fig. 1. Practically the same formation is presented in Fig. 2, except that the parts are de-equalized in measure,

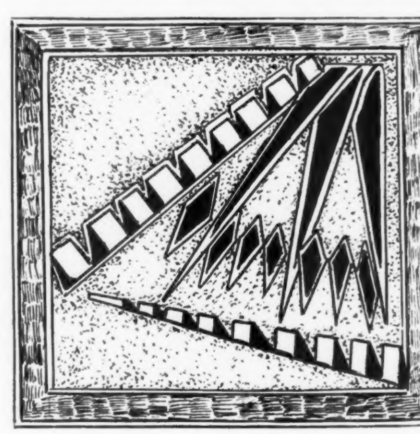


Fig. 4. Designs that have jazz effects are popular in cement tile

which action is supposed to improve the quality of the design by making it more attractive to the average person.

A design cannot lean too much towards the conventional and appeal to the visage of many persons in an age when the design appeal rages the way in which it is doing now. Recognizing this trend in cement craft sales is about as necessary as it has been to recognize the color appetite in all things during recent years. So the deadly conventional limit cannot be safely attained without risk of producing designs which will not meet with the approval of the masses.

A conventional design of the strict order is one in which typical forms from nature, from the carved stones of the moderns or the ancients or from engravings, are repeated and reconstructed either on the basis of a lively imagination or analysis carefully worked out. A conventional design of the standard type may look like that shown in Fig. 3, in which the parts are equalized throughout, and according to some modernists do not catch the eye as quickly or hold it so long as a design in which there is some jazz effect present as shown in Fig. 4.

The motif here presents greater possibilities for color at least. It is a design which conforms more to art moderne than the former design. Some might say that a design of this description possesses style because the long strokes of ornamentation in relief or in color closely imitate the spear-pointed effects which are being executed by the designers of the world's fashions in all things.

Thus have interpretation and exploitation in cement designing shifted about within a short period of time. The conditions of the era have brought it about. The newer designs are being launched so fast that it is difficult for one to keep up. What they will be in 1931 is hard to forecast, but just now most of them are about as beautiful in form and color as the designs in any industry which, in a way, accounts for the stimulating effect they have brought about for marketing cement products.

Milwaukee Concrete Products Association Disbands

NOTICE of dissolution was filed October 13 for the Milwaukee Concrete Products Association, Milwaukee, Wis.

This organization was formed in 1929 by an attempted central co-operative agency of many concrete dealers in Milwaukee county for the sale of concrete products under standardized sale conditions.

Some of the members, however, became dissatisfied and threatened withdrawal from the association and it was finally decided to dissolve. Notice of dissolution was signed by J. G. Jensen, the president, and A. W. Scher, secretary.

Original articles for the co-operative were signed by Mr. Jensen, Mr. Scher, D. R. Collins, L. E. Schwaede and W. T. Sullivan.—*Milwaukee* (Wis.) *Journal.*

Ready-Mixed in England

WHETHER OR NOT the factoring of ready-mixed concrete from central mixing plants will become common in England is a question subject to considerable debate, it would appear from current copies of British trade papers. In a recent issue of *Cement, Lime and Gravel,* J. L. Wellings, associated with Millars Machinery Co., Ltd., of London, writes an exhaustive treatise on the subject based on American practice. To an American reader the text is elementary and confirms the impression that obviously scant knowledge of ready-mixed concrete exists in the minds of the average English rock products periodical reader.

In his introduction to Mr. Wellings' story the editor says:

"To a small extent, central mixing has been adopted for certain jobs, but not the factoring of the concrete. Particularly in America it has become quite common, and we read in an American contemporary, recently, that central mixing and factoring can sometimes be made a success in or near a town of 50,000 inhabitants, can frequently be successful with a population of 70,000, and leaves no doubt of success when there are 100,000. From which it seems that there are very many districts in this country where central mixing and factoring can be made a successful undertaking.

"We believe this article is the first comprehensive article on this subject published in this country, and the writer speaks from experience of these plants in America."

Knoxville (Tenn.) Ready Mix Concrete Producer Gets Big Contract

THE $200,000 contract to furnish and mix the concrete for use in the Henley Street bridge has been awarded to the Ready Mixed Concrete Co., of Knoxville, Tenn., it was announced recently.

The contract is the largest single order for ready-mixed concrete which has ever been placed in the South. The Ready Mixed Concrete Co., of which Col. John L. Humbard is president, are sub-contractors under Booth and Flinn, general construction company.

Thirty-seven thousand cubic yards of concrete will be used in the bridge. All of the materials will be mixed at the Ready Mixed concern's plant at the corner of Tennessee and Davanna avenues.

The material will be hauled to the bridge site in a fleet of 15 trucks, which are owned by the Knoxville company, Colonel Humbard said.

The contract will extend over a period of approximately twelve months, as the material will be used throughout the entire period of bridge construction by Booth and Flinn, which is the Pittsburgh concern awarded the contract to build the span across the river by the city.

Colonel Humbard said yesterday that the letting of a sub-contract for the concrete to be used in the bridge to a ready-mixed company showed the importance which the construction business is placing in this variety of work.

The Ready Mixed Concrete Co. was organized in Knoxville about two years ago. Colonel Humbard is president. Other officers are J. G. Humbard and Ben Humbard, vice-presidents; J. B. Davis, secretary and treasurer. The officers, together with L. H. Kidd and T. L. Peters form the board of directors.

Colonel Humbard is also president of the John L. Humbard Construction Co., which has done considerable state and municipal work in the South during the past several years. Mr. Humbard was president of the Tennessee Road Builders' Association for two terms.

The ready-mixed concrete is meeting with popular approval over the entire country, it was pointed out. The quality is high because of the centralized system of mixing. All materials and water are weighed and measured into the mixer.

The Medical Arts building is an example of a structure using the ready-mixed concrete. The local company furnished the materials on this job, which was only recently completed.—*Knoxville* (Tenn.) *Journal.*

Ready Mixed Concrete Producers to Hold Annual Meeting at St. Louis, Missouri

AT A MEETING of the executive committee on October 8, at Pittsburgh, Penn., it was decided that the convention of the National Ready Mixed Concrete Association will be held at the new Hotel Jefferson, St. Louis, Mo., on January 26, 1931. J. E. Burke is president, 27 Barbeau street, Pittsburgh. The day set for the convention is the Monday following the annual convention of the National Crushed Stone Association, and preceding the annual convention of the National Sand and Gravel Association, at the same hotel.

Ohio Crushed Stone Prices Reported Weak

THAT NOW is a very profitable time for the construction of roads is evident from the bargains in materials obtained by the Huron county (Ohio) highway department. Broken limestone used for road work has declined in price from $2.40 a ton to $1.40. It is given out that the big stone concerns of the Bellevue and Sandusky districts have accumulated such a surplus of limestone that it has been decided to slash the price in order to reduce stocks. It is predicted that next season, the price will be higher.—*Norwalk* (Ohio) *Reflector-Herald.*

Proposed Mississippi Cement Mills

THE YAZOO PORTLAND CEMENT CO. now has offices on the fourth floor of the Merchants National Bank building, Vicksburg, Miss.

Plans for the establishment of a portland cement plant north of the city are progressing satisfactorily, President Ralph T. Miller stated recently. Much detail work, legal and otherwise has been done and much remains to be done in order that the company may be soundly launched, he said.

Mr. Miller stated that there is nothing at present of material interest to the public. The officials state, however, that they had very pleasant business relations with the state officials at the capitol and the legal phase of the business, in so far as the state is concerned, was satisfactorily adjusted.

"It takes about eight months after everything else is ready, to get a cement plant, such as we propose to build here, in operation," said Mr. Miller. "A modern cement plant is built of concrete and is fireproof. In fact I know of no other industry that uses more care than cement people in building plants. It means much in insurance for the fire hazards would be heavy unless the buildings are fireproof.

"In the old type of cement structure, a few of which are still in operation, insurance rates are high. Cement plants must have intense heat and fireproof buildings are therefore used altogether by present-day manufacturers.

"There is one impression that the people here seem to have that is erroneous, and that is that a cement mill gives off clouds of dust that settle to earth for some distance around the mill. The modern mill does not have a particle of dust about it. Neither is there undue noise, either by blasting or otherwise. The impression that cement mills are dusty comes from the fact that they were exceedingly dusty years ago. But inventions have brought about new processes that eliminate the dust entirely. People living near the area in which the mill will be located here need have no fears of the dust nuisance."

Mr. Miller stated that the officials of the Yazoo Portland Cement Co. have met with every courtesy here from the business men of the town, and that many citizens also have shown much interest in plans for starting the erection of the plant here soon. "I am not much on publicity although we have nothing to keep from the public," said Mr. Miller. "We believe that there is an opportunity to make a big success of the manufacture of cement here and we are moving along safe and sane lines so that the construction of the buildings can be begun as soon as possible. Making cement is just a good solid basic industry and there is money to be made in it. But it is no get-rich-quick business. Profits should be more than satisfactory here, however, for the field can be largely developed in nearby counties and states, on account of the very favorable freight rates.

"The cost of manufacture here will be lower, for the location is ideal and the cement rock is in hill formation and can be handled with less overhead cost than in most other localities," he said.—*Vicksburg* (Miss.) *Herald.*

"Philadelphia (Miss.) has a wonderful opportunity awaiting, if the proper co-operation of the citizens can be obtained," according to information given out by W. A. Guest, representative of a cement company, who is seeking a location for their cement plant. He said:

"The material to be used is to be found near here, and the G. M. & N. railway, having offered cheap transportation rates, Philadelphia is a very desirable place."

G. M. & N. officials met here last week with Engineer Alford, of the construction company, to see what could be done in regard to the matter.—*Philadelphia* (Miss.) *Democrat.*

Cement Committee of A. S. T. M. Reorganized

AT A MEETING in Washington on September 5 and 6, 1930, Committee C-1 on Cement, of the American Society for Testing Materials effected a reorganization and prepared a preliminary program of work for the coming two years.

During the past year the committee submitted to the society a tentative specification for high-early-strength portland cement and an upward revision of the standards for portland cement. Both of these have been adopted by the society and are now in effect.

With this new tentative standard and the revised standard in force, the committee believes that the opportunity is ripe for rather more fundamental and detailed studies of these two most widely used hydraulic cements, and of the masonry or plastic cements, whose use is growing so rapidly, than was possible with the organization under which the committee had functioned for so many years. A letter ballot almost unanimously approved a reorganization along certain suggested lines. The meeting referred to was to carry into effect these approved suggestions.

The outstanding feature of the new plan of committee operation, places the investigations of each type of cement and the preparation of a standard under a separate subcommittee. For the present, therefore, there will be a subcommittee on standard portland cement, one on masonry cement, and one on all high-early-strength cements—both of the portland and high alumina type. Another subcommittee will have the duty of preparing the standards for methods of test. This is essential, since the society will issue the methods of test as separate publications from the physical and chemical requirements for all hydraulic cements. This subcommittee will not indicate to the other subcommittees what methods they should use, but rather will help the other subcommittees develop and refine the methods they think are needed to indicate the desired requirements, and further make as uniform and co-ordinated as possible the testing methods for all hydraulic cements.

In planning future work, the committee believed it desirable to throw off the shackles of precedent and past history. With two new standards just in effect, there is time at hand to make extensive studies of the sometimes considered radical new test methods suggested by progressive users and producers. It was not believed desirable to study any method or requirement simply because it was one of long-standing. Rather studies should be made of those requirements which are believed to be indicative of a needed property in the cement. Further, a needed property would be considered one which would indicate the deportment of the cement in use over a long period of time or under possible adverse conditions rather than that one which would indicate laboratory differences in cements.

The total membership of the committee is limited to seventy-five, in order to lessen the danger of its becoming slow, unwieldy, and inefficient, but it will welcome at all times, and especially now when the subcommittees are developing new programs of investigational work, suggestions from all those interested in the testing and using of cement. The committee would be very glad to have comments as to the types of tests which should be studied, data indicating the adequacy or inadequacy of present methods, suggestions as to specific requirements, and in fact anything that an interested party would consider of value to the committee.

To complete the reorganization required by the new by-laws, the election of the officers made at the June meeting was confirmed. The committee will continue under the chairmanship of P. H. Bates, Bureau of Standards, Washington, D. C.; secretary, F. H. Jackson, U. S. Bureau of Public Roads, Washington, D. C.; and A. C. Tagge, Canada Cement Co., Ltd., Montreal, and R. B. Young, Hydro-Electric Power Commission of Ontario, Toronto, as vice-chairmen.

Ohio Contractor Sues Gravel Producer Because Material Did Not Meet Specifications

AN OHIO HIGHWAY CONTRACTOR has brought a suit for damages against a sand and gravel company for $2,064 on the allegation that he was awarded a road building contract on a state route and he entered into a contract with the sand and gravel producer to furnish gravel at the site. The product was to be of state standard. The contractor charges the gravel company failed to fulfill its contracts, entailing damage of $2064 to him.

Spending of Fifty Billions for New Homes Forecast

AT LEAST $50,000,000,000 will be spent on new residential construction in the United States during the next twenty years, according to estimates presented to the recent meeting of the planning committee of the President's Conference on Home Building and Home Ownership and announced September 29 by Secretary of Commerce Robert P. Lamont, Chairman of the Conference.

It was also brought out at the conference, the Secretary declared, that in addition upwards of $500,000,000 is being spent currently on household repairs and maintenance. As the work of the conference develops, he said, it will aid in solving the immediate problems of the home building industry and of families that are trying to improve their homes.

"A compilation of the most recent surveys made throughout the country indicates that in many centers the number of desirable vacant houses and apartments is not excessive, and that, with the present low rate of residential building activity, a resumption of more active building will soon be required by the needs of our steadily growing population, and the razing of old structures," Mr. Lamont stated.

"Conditions are now favorable for home builders who have the resources and intend to build, to go ahead," the Secretary declared, pointing to recent drops in prices of important building materials, the availability of an ample number of highly skilled building trades workers, contractors anxious to obtain work, and the general availability of first mortgage money at reasonable terms. In general, conditions are also good for going ahead with repairs, alterations and improvements to existing houses," he added.

Months of committee work will precede the main conference which probably will not be held for a year. The conference will deal in large measure with the long view of things but through the press, and through such organizations as Better Homes in America, with its 7,000 local committees, important findings can be relayed quickly to the general public.

The personnel of the conference will consist of twenty committees and comprise perhaps close to 1,000 members. There will be something of an organization built up in the Department of Commerce to co-ordinate the work of the committees.

The intense interest shown by all present at the meeting of the planning committee gives the best possible assurance of practical results from the work. Representatives of organizations embracing millions of families in their membership soon found grounds of common understanding with leading business, professional and civic groups. The scope of work of the conference was interpreted broadly to extend over a wide range of problems connected with home making, family financing, and housekeeping, as well as the provision and financing of new homes. Home financing came up again and again as an outstanding problem that had a bearing on numerous other questions.

It was clearly brought out, for example, that assured quality of new construction, so important to home buyers and home builders, is a goal that interests financing agencies who want the best possible securities behind their loans. Reputable builders want assured quality because they suffer when an unscrupulous or ignorant competitor puts improperly built houses on the market, or bases a low bid on the expectation of doing inferior work. It appears that there is a fruit-

Another point emphasized at the meeting was the progress that would be achieved if the best practices in every branch of the home-building industry could be used generally. In the case of subdividing new residential neighborhoods, for example, it appears that obsolete customs are often followed, whether because of failure of the home-buying public to realize the advantages of the best modern practice, lack of interest on the part of the subdivider, or the deterrent effect of obsolete laws or regulations that were not framed in the light of present-day conditions or knowledge.

Feldspar Grinders Hold Meeting at Spruce Pine

THE Feldspar Grinders' Institute, with representatives from the United States and Canada met in Spruce Pine, Tenn., September 26 and 27.

A banquet was held in the Topliff hotel on the evening of September 26. The meeting was opened with an address of welcome to the members and the visitors by Herbert P. Margerum, president, of Trenton, N. J. Response was made by B. C. Burgess, of Spruce Pine, manager of the Tennessee Mineral Products Corp., who expressed appreciation to the Feldspar Grinders' Institute for bringing the meeting to Spruce Pine. He stated that the growth of the community is largely due to the development of the feldspar industry.

Work Described

The work of the Institute was described by W. J. Parker, commissioner, of New York City, who introduced C. H. Peddrick, Jr., vice-president, of New York City. Mr. Peddrick said that the Institute needed a 100% membership to accomplish the greatest good for the industry and invited the non-members to give their moral support whether or not they desired to assist in financing the Institute.

E. Frank Watson, of Burnsville, C. P. Rogers, of Tryon and W. F. Deneen, of Micaville, responded, expressing their willingness to co-operate. Herreld D. Thropp, vice-president, of Trenton, N. J., thanked the visitors for attending the meeting so that all might get better acquainted.

The meeting adjourned with the expression that more of the meetings should be held in the South where a large attendance may be had. Members were enthusiastic over the 95% attendance, stating that never before had this been attained.

Guests

Other guests present at the banquet were Mr. and Mrs. R. F. Brenner and Miss M. A. Murray of Trenton, N. J., the latter secretary of the Consolidated Feldspar Corp., of Trenton; Mr. and Mrs. B. C. Burgess, of Spruce Pine, Peter Thropp, of Trenton, R. W. Lawson, Erwin, Tenn.; Mr. Keening, of Erwin; Frank Knight, Jr., of West Paris, Maine; C. L. Morton, John Boyd, Albert Ackerman, and Carey Jeffree, Spruce Pine; Archer Womack, Johnson City, R. H. DuFault, New York City, Ed. Brockman, Cincinnati, Ohio; Jack Dennis, Toe Cane, Jack Wilkes, Trenton, and Chief of Police William P. Walter, of the City of Trenton.

The majority of the visitors attended the Toe River Fair showing great interest in the Miners' Day activities. Keen competition was shown, as all first prizes were doubled by the Feldspar Grinders' Institute.

Michigan Gravel Producer Tests Village Zoning Law

THE CONSTITUTIONALITY of the Bloomfield Hills (Mich.) zoning ordinance is expected to be tested in Circuit Court this month, when Floyd Beardslee, of Pontiac, will be tried for opening a gravel pit in the residential section of Bloomfield Hills village.

Mr. Beardslee was tried recently in the court of Justice Floyd S. Buck for this offense. He asked that his original plea of not guilty at his arraignment be changed so that it might read on the court record, "stood mute." His request was granted, and a plea of not guilty was entered for the defendant by the court. He was represented by attorneys, who made no defense.

The village was represented by an attorney and police sergeant who testified for the people. Mr. Beardslee was found guilty and ordered to pay a fine of $25 or spend 15 days in jail. He immediately appealed.

Mr. Beardslee bought the piece of property in the northeast corner of the village several weeks ago for the purpose of opening a gravel pit on it. Construction work had been progressing for about four weeks, and he was on the point of opening the pit when he was arrested September 24 by the police at the order of the village commission, which had held a special meeting the evening before for the purpose of taking action on the matter.

Mr. Beardslee made no denial of the facts in the case, Justice Buck said, but desired to get the case in circuit court to test the constitutionality of ordinance.—*Birmingham* (Ala.) *Accent*.

Comparative Resistance of Certain Metals to Abrasion

Report on Preliminary Tests

By David M. Ehrsam
J. B. Ehrsam & Sons Mfg. Co., Enterprise, Kan.

IT IS WELL KNOWN that in industries where materials are transported from one place to the other by means of chutes or spouts, replacement, due to wear of these parts, constitutes expense. This wear, of course, depends on the abrasiveness of the material handled, and equipment is usually designed to meet the particular properties of the material.

This problem of wear has always been more or less serious in the mineral industries. While the manufacturers and sellers of various materials have made statements as to the abrasion resistance of their particular product, there seems to be little or no data as to the relative value of materials used for this purpose. It was therefore decided to conduct a series of experiments in an endeavor to obtain such data.

Experimental

The materials tested were 12-gage blue annealed steel, medium (0.30 to 0.40) carbon steel, hot-rolled spring steel (0.90 to 1.15 carbon), manganese steel and ¼-in. rubber (pure gum) liner.

An ordinary sand blast with a fine steel shot was used as an agent to secure a large amount of wear in a short time. The nozzle of this was directed vertically downward to a 6-in. by 12-in. specimen of the material to be tested, placed at an angle of 45 deg. with the horizontal and 8 in. from the nozzle (see Fig. 1). Each specimen was given three treatments with 50 lb. of shot. The air pressure fell from 95 lb. to 75 lb. during each run. The time required for each run was about 25 minutes. Table 1 gives the results of these runs.

TABLE 1—RESULTS OF SAND-BLAST TESTS OF ABRASION, USING FINE STEEL SHOT

Material	Amount of shot	Weight of sample	Loss	% loss
Blue annealed steel	....	0.977 kg.	....	....
	50 lb.	0.956 kg.	21 gm.	2.1
	100 lb.	0.942 kg.	35 gm.	3.5
	150 lb.	0.933 kg.	44 gm.	4.5
0.30 to 0.40 carbon steel	....	1.015 kg.	....	....
	50 lb.	0.998 kg.	17 gm.	1.6
	100 lb.	0.984 kg.	31 gm.	3.0
	150 lb.	0.971 kg.	44 gm.	4.3
Hot-rolled spring steel	....	0.997 kg.	....	....
	50 lb.	0.985 kg.	12 gm.	1.2
	100 lb.	0.975 kg.	22 gm.	2.2
	150 lb.	0.966 kg.	31 gm.	3.1
Manganese steel	....	0.938 kg.	....	....
	50 lb.	0.928 kg.	10 gm.	1.1
	100 lb.	0.922 kg.	16 gm.	1.7
	150 lb.	0.915 kg.	25 gm.	2.5
Rubber belt lining	....	362.1 gm.	....	....
	50 lb.	*362.3 gm.	....	....
	100 lb.	362.1 gm.	0.2 gm.	†0.1
	150 lb.	361.9 gm.		

*The rubber gains weight due to the imbedding of a small quantity of shot.
†Less than.

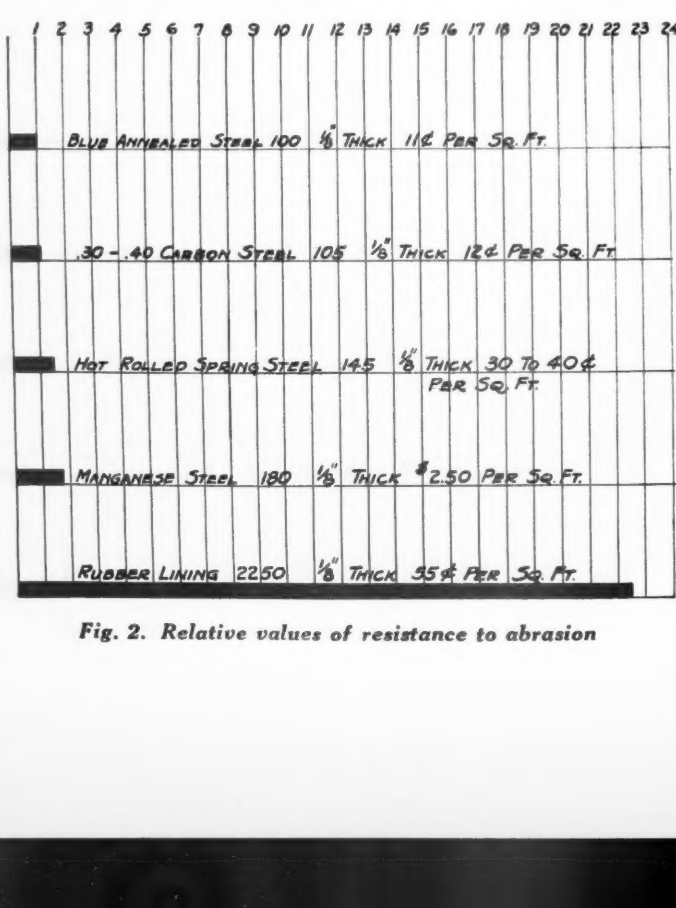


Fig. 2. Relative values of resistance to abrasion

Conclusions

In order to get a simple method of comparison the resistance to abrasion of the blue annealed steel is arbitrarily taken as 100 and a proportion established. As the metal samples are approximately ⅛ in. thick and the rubber lining is ¼ in. thick, it is necessary to divide the value of the rubber by two. Fig. 2 shows these values and the approximate cost of the materials.

From these tests it appears that rubber lining is by far the most resistant to abrasion. The values of manganese steel and the hot-rolled spring steel are unexpectedly low. It is hoped that further experiments can be conducted under more rigid control, duplicating more closely actual conditions.

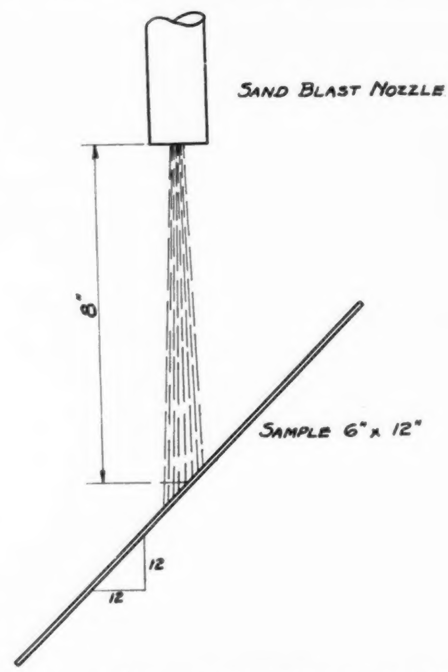


Fig. 1. Diagram of apparatus used to test abrasion resistance

Indiana To Tax Sand and Gravel From Lake Michigan

IN THE IMMEDIATE FUTURE Indiana will collect a tax for every cubic yard of sand and gravel obtained from the bottom of Lake Michigan bordering along the shore line of that state. It is estimated that year in and year out the producing companies take from 3,000,000 to 4,000,000 cu. yd. of sand from the lower end of the lake for fills, building and paving purposes in the Chicago district. It is considered certain that payment of a state tax for their product will mean higher prices to the consumers.

Richard Lieber, director of the Indiana Board of Conservation, announces that a special meeting is to be held at an early date in Indianapolis, at which time it is expected a tax rate on sand and gravel will be established.—*Chicago* (Ill.) *Calumet Index.*

Accuracy Requirements of Multiple V-Belt Drives

By R. E. S. Geare, M. E.
L. H. Gilmer Co., Tacony, Philadelphia, Penn.

VERY frequently in a multiple V-drive one or more belts will be noted to sag to a greater degree than adjacent belts. Conclusions are often quickly reached that those particular belts which show the greatest sag are stretching badly. While this may, in very rare cases, be true the real facts are usually found to be that the sagging belts are a small fraction of an inch longer than the other belts and were originally so at the time of installation, or that the V-grooves in the sheaves are incorrectly cut. Then, too, the lodging of dirt on the sides of the grooves will produce unevenness in the belts.

Few operators realize the large sag effect

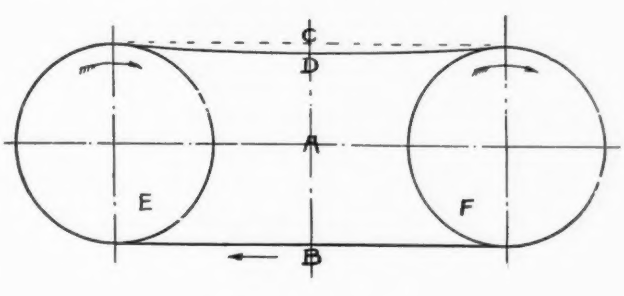


FIG-1.

that will be obtained by the small addition of a fraction of an inch in the length of a belt. Hence a consideration of this point will prove interesting.

We will assume a driving pulley V-sheave *E* and a driven sheave *F* with a number of *V*-belts.

Points of consideration are: (1) variation in lengths and width of belts, (2) accuracy of the V-sheave grooves.

1. Where there are a number of belts transmitting the load it is desirable, but not of great importance, from a standpoint of efficiency, to have all belts of an exact length. It is true, as a general thing, that with an increasing length of a belt, with a resultant distance of sag *CD*, there will be a greater arc of contact on each sheave and hence a higher degree of power transmission. Considering the fact, however, that V-drives are figured for 180-deg. angle of contact as a rule, with an efficiency of transmission as high as 98%, there cannot, on a standard drive, be any great advantage in increasing the sag purposely. This sag (*CD*) may appear to be quite great, yet it is not often considered how small may be the factor which creates such a large sag. For instance, take the question of difference in lengths of belts, Table 2 assumes a number of different distances between centers and takes the case of difference in length of belts of ½-in. and 1-in. The driving side is assumed without sag.

FIG. 2—SAGS CAUSED BY SLIGHT DIFFERENCES IN LENGTHS OF V-BELTS

Center distance between sheaves	½-in *DL* approximate sag (*CD*)	1-in. *DL* approximate sag (*CD*)
10 in.	1.6 in.	2.2 in.
20 in.	2.2 in.	3.2 in.
50 in.	3.5 in.	4.9 in.
100 in.	5.0 in.	7.0 in.

DL designates differences in length between a belt which is taut between two sheaves and one which is increased by the dimension shown.

It becomes apparent that the actual distance of sag increases, for a given difference in length of belts, in proportion to the distances between centers.

In the method of construction used in building a belt with all power transmitting cords at a neutral axis, exact lengths are obtained because of the use of molds of similar length. Furthermore, the additional use of properly vulcanized rubber surrounding the cords, together with breaker strips, effectively stops any tendency to stretch.

Belt stretch, however, is not the main cause in many cases for unequal sags in belts. The greatest trouble is usually found in the sheave itself.

Fig. 3 shows the action of a V-belt in its groove.

A shows the belt entering the groove, at *B* it is seating, and at *C* the sides are in tight contact with the sides of the groove. The load is picked up gradually as the belt seats itself and naturally exerts a shock absorbing effect, entirely independent of the elasticity of the belt itself. This is the ideal condition. If all grooves are cut absolutely correctly and are polished this action will take place simultaneously in each belt of the drive.

Assume, however, that: (1) Angle of one or both sides of groove incorrect; (2) rust or foreign material has deposited on one or both sides of the groove, (3) sides of groove are roughly machined.

Any one of the above items will make the belt ride high in the groove and thereby tend to increase the length of that particular belt. The other belts will then have the appearance of sagging. Furthermore, one high spot on the side of the groove would cause an up and down slap of that belt. Under such conditions the sides of the belt would not engage properly against the sides of the groove. Loss of power transmitted by that belt would result.

The purpose of the foregoing discussion is to emphasize the great importance of properly machined V-sheaves, yet to allay fears on the part of many operators who may discern what seems to be an unreasonable sag in a belt.

A belt that actually stretches badly under load conditions is not desirable. Yet it is reassuring to know that a V-belt drive, with accurate grooves, will function properly in the matter of efficient power transmission, even though belts are of unequal length. The sheaves, however, *must* be accurate in order to assure best performance.

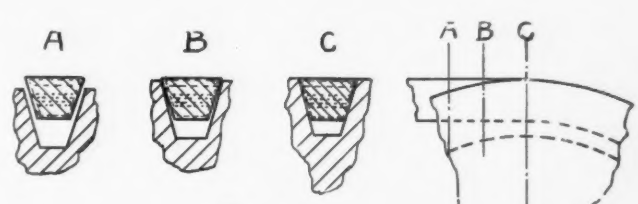


FIG-3.

The Sulphur Industry

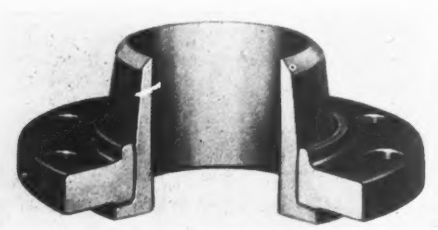
VERY COMPLETE INFORMATION regarding the sulphur industry of the world is found in Information Circular, No. 6329, August, 1930, published by the Bureau of Mines, Department of Commerce, Washington, D. C.

The properties, occurrence, methods of production, uses, consumption, and marketing of sulphur are covered, with statistics, and considerable information is given on its most important product, sulphuric acid, with a list of such plants in the United States.

New Machinery and Equipment

New Type of Flanged Joint Has Many Advantages

THE MERCO NORDSTROM VALVE CO., San Francisco, Calif., is manufacturing a new type of flanged joint for use in connection with welded pipe lines where such a joint is required for the insertion of valves and fittings for the taking off of outlets.



New type of flanged joint

Known as the Merco swivel flange, it is claimed that it possesses the inherent flexibility of the Vanstone type of flange, plus the strength of an ordinary butt-welded flange.

The device consists of a drop forged steel flange, fitted to a drop forge tapered nipple on which the flange may be rotated, permitting alignment of bolts, etc. The tapered nipple is forged from a solid steel billet and the finished product incorporates a thickness much greater than pipe at the base of the nipple where highest stress occurs. The manufacturers state that by forging from a solid billet sufficient heat is stored up in the steel to permit the operation being finished at the correct forging temperature, which process minimizes the possibility of a fracture in the metal.

An additional advantage is offered by the new flange, it is claimed, where service requires a special alloy such as the new chrome nickel steels. For such service the tapered nipple only is forged from the alloy, while the flange is forged from ordinary steel, which of course means a saving in the cost of the flanged joint. The tongue-and-groove type of construction can also be incorporated when desired, and the flanges can be furnished with pipe nipples of various lengths welded on before leaving the factory.

The new flange will soon be available in sizes from 1½-in. to 10-in. with specifications to meet standard strength requirements.

Synchronous Motor Driven Horizontal Compressors

THE GARDNER-DENVER CO., Denver, Colo., is manufacturing a line of heavy-duty, horizontal, duplex type synchronous motor driven compressors, designated as Class "HA."

The duplex horizontal construction, it is claimed, has a number of advantages. The balanced construction with the cranks at an angle of 90 deg. effects an equalization of efforts; the reduction of structural stresses, low head room, utmost accessibility and small floor space are important features.

The main frames are of the heavy duty side crank type, designed and reinforced to give maximum strength and rigidity. They are supported on the foundation throughout their entire length. The main shaft is a solid forging, the central portion of which is enlarged to carry without deflection the weight of the motor rotor, as well as the flywheel when the latter is required.

A distinct advance in compressor design, states the manufacturer, is the use of Hyatt roller bearings for the main shaft.

The air cylinders, semi-steel castings, are supported upon pedestals or base ells, secured to the foundation. These pedestals not only support the cylinders but serve as a suction ell for the low pressure cylinder and discharge ell for the high pressure cylinder.

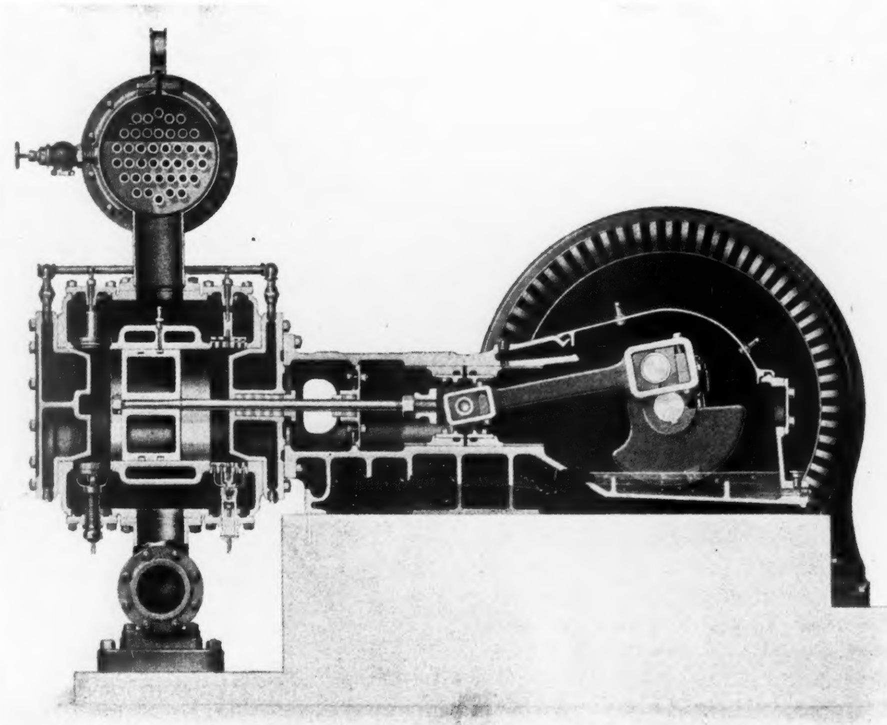
The air valves are located radially at each end of the cylinder, and both inlet and discharge valves are of the Gardner-Denver Duo-Plate type. Air pistons are of the box type, and piston rods are of high carbon steel, fitted to the piston with a taper fit and shoulder.

An intercooler, consisting of a steel shell containing a nest of steel tubes through which cold water circulates, is arranged transversely above the cylinders.

The air output of the compressor is regulated by a Gardner-Denver unloader. Unloading is accomplished by lifting the inlet valves from their seats and allowing the air in the cylinder to freely pass in and out of the inlet valves without being compressed.

All bearings and running gear are splash lubricated, and air cylinders are oiled by means of a force feed lubricator, belt driven from the main shaft.

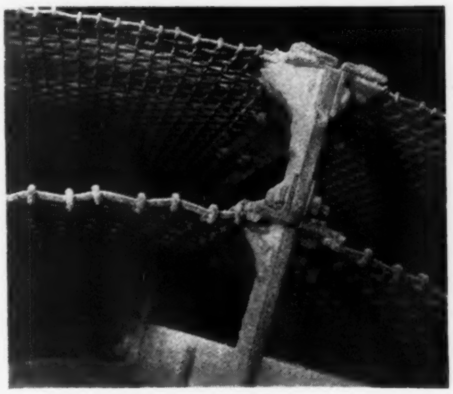
Among the important advantages claimed for these direct connected motor-driven compressors are quiet operation, low power consumption, due to the elimination of belt loss, and saving in floor space.



Showing duplex horizontal construction of heavy duty synchronous motor driven compressor

Woven Wire Screens Made of New Resilient Alloy

THE LUDLOW-SAYLOR WIRE CO., St. Louis, Mo., is now making woven wire screens of "Spring-Steel," a hard, resilient alloy which the manufacturers state is of particular advantage for severe service on revolving-screen jackets, vibrating screen sections and shaking and gravity screening surfaces, and that woven wire screens made



Woven wire screen made of new resilient alloy

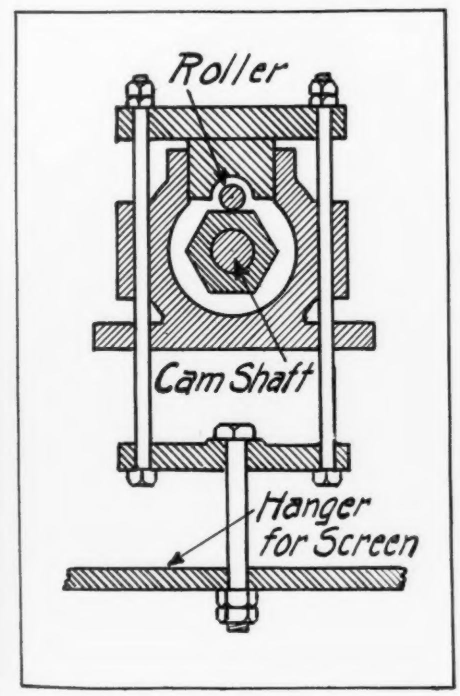
of "Spring-Steel" last several times as long as the same grades made of ordinary steel.

The first installation made in 1926 is reported to be still in service, and consists of two cylindrical outside jackets on a revolving screen handling crushed limestone road ballast. These jackets have been used continuously since their installation, it is said, and are still good.

The new product has also been tested on all the various types of vibrating screens for use in screening crushed stone and gravel, and these tests, it is claimed, have proven its extraordinary wearing qualities.

New Vibrating Screen

THE WILLIAMS PATENT CRUSHER AND PULVERIZER CO., St. Louis, Mo., is marketing a new "Kam-Tap" vibrating screen. It can be used as a single-deck

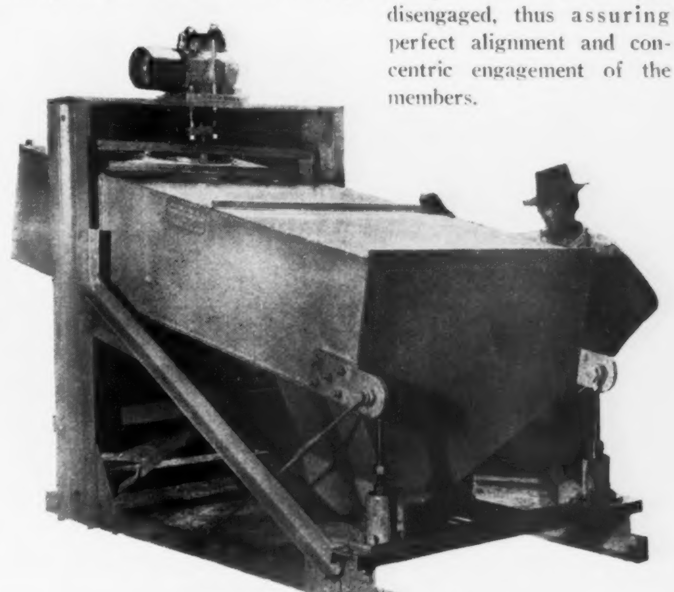


Showing details of vibrating mechanism

scalper, or the three-deck type can be employed as the main separating unit. In the latter work, it is claimed, the "Kam-Tap" will make an accurate separation. It is claimed to be particularly fitted for screening silica sand, asphalt filler, talc and for other fine work.

An outstanding feature claimed for this screen is the unusually wide degree to which vibrations can be regulated. As will be noted from the illustrations, the entire screen frame hangs from the cam roller, which as it rides over the cam points at high speed, causes the vibration and the motion which shakes out the fines and keeps oversize material from blocking the screen openings. Cams with 4 to 8 points are available and are interchangeable, and by increasing or decreasing the number of cam points and by regulation of the cam shaft speed vibrations per minute can be adjusted, as well as range of rise and fall and violence or speed with which the screen surface is raised and lowered. Cams operate in an oil bath and are very lasting, due, it is said, to the fact that the cam roller passes over the cam points with a rolling rather than rubbing motion.

"Kam-Tap" screens are built in 10 sizes, and with one, two or three decks. A light type is available for handling light finely ground materials in fineness from 8- to 200-mesh, and a heavy duty type screens rock, shale, coal and similar heavy materials. Both types operate on ball bearings throughout, and handle either wet or dry material. They can be furnished in all sizes with either pulley or belt drive from existing countershafts, or with individual motor drive mounted on the screen frame.



New vibrating screen is particularly fitted for screening fine materials, such as silica sand, talc, etc.

New Line of Magnetic Clutches

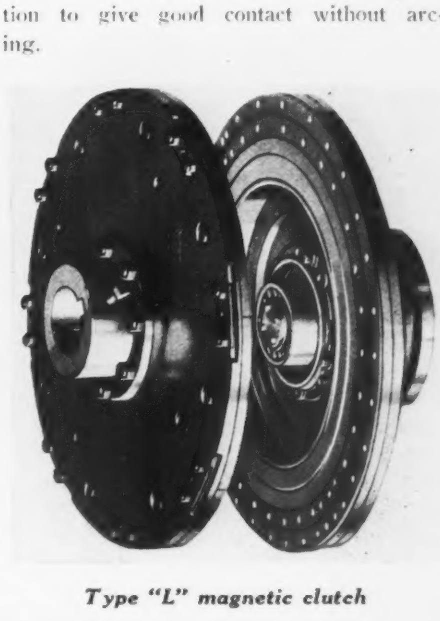
CUTLER-HAMMER, INC., of Milwaukee, Wis., is marketing a new line of magnetic clutches, which it is claimed have better and more consistent operating characteristics, easier installation, greater safety, and easier access to parts which may have to be renewed.

The new clutches are known as the "Type L" because of the shape of the armature, the cross-section of which is "L" shaped so that it fits around the magnet coil. This, it is said, gives a greater and more steady magnetic pull throughout the life of the lining.

The magnet coil is wound on a sheet metal form and vacuum impregnated before it is inserted in the field member. The coil is locked in place by means of four mounting studs which extend through the field casting and loosening the four studs allows removal of the entire coil. All coil terminals are recessed below the surface of the field member to protect them against damage.

A centering bearing, which is a roller bearing mounted in the field member, and which protrudes so that it fits into a recess in the armature hub, forms a common support for both clutch members, yet allows either member to revolve independently of the other when disengaged, thus assuring perfect alignment and concentric engagement of the members.

The manufacturer states that a definite improvement has been made in the design of the collector rings for these clutches. The collector rings are made of brass to prevent corrosion and are mounted away from the hub, on four insulated studs, so that it is practically impossible for enough dust to collect to cause creapage between the rings. Two carbon brushes are used on each collector ring so that one brush is always in position to give good contact without arcing.



Type "L" magnetic clutch

Inhabitants of Staid New England Town Think Up Objections to Gravel Plant

NORTH ADAMS, MASS., a small typical New England city, is threatened with its first sand and gravel plant. The result is opposition on grounds that are a credit to the imagination of some of the town's inhabitants, if nothing else. The *North Adams Transcript* tells the story:

"Appearing before the board of appeals in opposition to the granting of a permit for the installation of a sand and gravel washing plant, the first of its kind in the city, at the sandbank of Mayor William Johnson and Public Welfare Commissioner J. Edward Fitzgerald last evening, William G. Roberts, proprietor of the Excelsior Printing Co., proclaimed the belief that if the permit is granted it will be but a short time before the city makes a new rule requiring the use of washed sand in every public improvement project which requires sand or gravel.

"Mr. Roberts and three other owners of property in the neighborhood of the sandbank which is located back of the former Central Playground property at the corner of Houghton and River streets, entered vigorous complaints against a dust nuisance which they said has existed since the sandbank was opened nearly three years ago and protested strongly against the granting of a permit on the grounds that operation of the sand and gravel washing plant might tend to aggravate the condition. No one appeared in behalf of the petition which was filed by Mayor Johnson and the board, which heard only opposition last evening, made no indication of what its decision would be or whether the hearing would be continued later to give petitioner opportunity to be heard.

"Leading the opposition to the granting of the permit, Mr. Roberts said that the dust nuisance has been so bad at times since the sandbank was opened that he has considered moving his printing office to a new location. He said that the dust, filtering into his building, has damaged some printing jobs of a fine character while he felt that it had lessened the value of residential property he owns in the neighborhood. He expressed the fear that when the sand and gravel dropped down from the sandbank to the level of the former playground lot and then was dumped into the hopper of the proposed washing plant, the dust would be thicker.

"Continuing, he said that he could see no reason for the installation of the plant at the sandbank in question, declaring that in a 'half-way decent' gravel bed such a machine would render only about 40% pure sand and that at the Johnson-Fitzgerald bank he did not believe more than 30% washed sand could be secured. Pointing out that there is not another sand washing machine in operation in this vicinity and questioning the need of the product, he declared his belief that if the permit were granted and the plant were installed, washed sand would soon be specified on all city work so as to compel the use of material from the bank owned by the city officials.

"John R. Button, secretary of the board of appeals, noted that in Pittsfield there is now a rule requiring the use of washed sand on city jobs, and Mr. Roberts heatedly replied 'Yes, you know how things are in Pittsfield politically. They do about everything they want down there. Do you want to tie North Adams up the same way?' He went on to tell of an Adams case in which a contractor was unable to finish a job because of a rule which required him to buy his sand and gravel from the owner of a certain bank.

"The others who entered objections to the granting of the permit were Harry Leavitt, owner of a six-tenement block near the sandbank on Houghton street, who told the board through his daughter who appeared for him, that it was impossible to open the doors and windows of the house last summer because of the dust and that tenants had threatened to move out; Harry Smith, owner of property at the corner of Bracewell and Chase avenues, who said that the dust traveled as far east as his home at times, and A. Charron, owner of a store and residential property opposite Mr. Roberts' printing office at the corner of Houghton street and Bracewell avenue, who also told of the dust nuisance."

OWNERSHIP OF ROCK PRODUCTS

Statement of the ownership, management, circulation, etc., required by the Act of Congress of August 24, 1912, of ROCK PRODUCTS, published every second Saturday at 542 South Dearborn street, Chicago, Ill., for October, 1930. State of Illinois, County of Cook, ss.

Before me, a notary public in and for the state and county aforesaid, personally appeared Nathan C. Rockwood, who, having been duly sworn according to law, deposes and says that he is the manager of ROCK PRODUCTS, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse side of this form, to-wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, Tradepress Publishing Corp.; Editor, Nathan C. Rockwood; Managing Editor, None; Business Manager, Nathan C. Rockwood.

2. That the owners of 1% or more of the total amount of stock are: W. D. Callender, Nathan C. Rockwood, both of 542 South Dearborn street, Chicago, Ill.

3. That there are no bondholders, mortgagees, or other security holders owning or holding 1% or more of total amount of bonds, mortgages or other securities.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company, but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest, direct or indirect, in the said stock, bonds, or other securities than as so stated by him.

NATHAN C. ROCKWOOD,
Business Manager.

Sworn to and subscribed before me this 7th day of October, 1930.

(SEAL) CHARLES O. NELSON.
(My commission expires May 27, 1934.)

Hearing on Cement Rates Held in Houston, Texas

AT THE HEARING held in Houston, Tex., on September 30, by H. W. Johnson and Robert Furness, examiners for the Interstate Commerce Commission, it was the testimony of L. R. Gardner, traffic manager of the Lone Star Cement Co. (Texas), Houston, Tex., that any change in the present freight rate structure as it applies to Houston, Galveston and Texas City would work to the disadvantage of the cement manufacturers of Texas.

Mr. Gardner also represented the Trinity Portland Cement Co., San Antonio Portland Cement Co., Southwestern Portland Cement Co. and the Republic Portland Cement Co. The cement companies of Texas intervened in the case in behalf of Houston, opposing strenuously any change in the present rates, or a grouping of the ports.

Mr. Gardner declared that should the three ports be placed in one group and given the same rates, it would only work to the advantage of the foreign manufacturers of cement, in that it would allow them a wider range of ports through which to ship their product. He pointed out that the cement companies of Texas have located their plants adjacent to the principal consuming points in Texas.

The witness said that the American companies are paying a higher wage scale to their employes than are the foreign companies, while the foreign companies enjoy low steamship rates which enable them to bring their product here and compete on the open market at a price much less than the one charged by the American manufacturer. Should there be any grouping of ports with a low rate, then the foreign companies would be able to extend the market in which they are now competing. Mr. Gardner declared that it was absurd to think of equalization of rates on short hauls, while the equalization would apply only to the longer distances.

Introduction by Mr. Gardner of testimony relative to the cost of production of cement in American and foreign mills brought strong protests from E. H. Thornton, traffic manager of the Galveston Chamber of Commerce, who declared that the witness was not qualified to speak along these lines, which brought up the tariff question.

Mr. Gardner replied that inasmuch as Galveston had predicated its entire case upon costs of operating at the three ports that it was only natural to assume the costs of the companies he represented should also come in for consideration.

Grouping of cement producing points outside of San Antonio and Waco with those two cities was cited by Mr. Thornton in his cross-examination of the witness. Mr. Gardner admitted that this was true, adding, "but the railroads are not trying to equalize San Antonio and Austin."

News of All the Industry

Incorporation

Sound Gravel Co., incorporated in the state of Delaware, 5000 shares, no par value.

Rideay Concretes, Ltd., Ottawa, Ont., Can., 500 shares of no par value.

Great Lakes Quarries, Ltd., Fort William, Ont., Can. 500,000 shares of no par value.

Strathmann Sand and Gravel Co., Camden, N. J., 2500 shares common.

Mines Chat Co., Kansas City, Mo., $16,000. J. Fred Willingham, Carthage Mo.

Massapequa Sand and Gravel Corp., Massapequa, N. Y., $50,000.

Rainbow Quarries Corp., Wyandotte County, Kan., 100 shares of no par value.

Connersville Gravel Co., Inc., Connersville, Ind., 750 shares, no par value. Clyde Piper, Ozro A. Kirkham and Fred Neuman.

Clarke County Lime Co., Osceola, Ia., $10,000. President, E. B. Johnson of Osceola; secretary, C. C. Graham.

Hattiesburg Gravel Supply Co., Hattiesburg, Miss., $50,000. Herbert Gillis, 608 John St., Hattiesburg.

Idaho Lime Marble Co., Portland, Ore., $125,000. L. Hahm, Gustaf A. Johnson and John P. Latourette.

Hodalga Lime Products Corp., Seattle, Wash., $50,000. Howard D. S. Hobson, J. C. Class and S. W. R. Dally.

A. J. Nutt Co., Toledo, Ohio, $500 and 250 shares of no par value. To manufacture and deal in plaster and other building materials. A. J. Nutt, O. L. Kankison and N. E. Baker.

Imperial Fossil Marble Corp., Goshen, Va., $250,000. To develop marble deposits. W. H. Warner of Cleveland, Ohio, and C. L. Williams of Steubenville, Ohio.

Marble Tex Corp., 59 E. Van Buren St., Chicago, Ill., $10,000 preferred stock and 500 shares common of no par value. To deal in all building materials. Wm. J. Sullivan, W. R. Edwards and H. H. Jarvis.

The Electrostone Co., Inc., Rushville, Ind., 500 shares preferred, par value $100 each, and 1500 shares common, no par value. To manufacture and deal in asbestos and gypsum. Charles T. Dehore, L. E. Eastman and George P. Smith.

Quarries

Dolese Bros. Co., Chicago, Ill., has moved its general offices to Room 663, 221 North LaSalle St., Chicago.

Blue Ridge Lime and Stone Corp., Ashford, N. C., is planning extensions and improvements to its plant, including the installation of material-handling and other equipment.

Imperial Fossil Marble Corp., Goshen, Va., incorporation notice of which appears in this issue, has secured an option on 1047 acres on slopes of mountains in Panther Gap about two miles from Goshen, and will develop marble deposits here.

Saluda Crushed Stone Co., Inc., Greenville, S. C., received an order for 100,000 tons of stone to be used in South Carolina's highway construction program. About two-thirds of that amount has already been delivered, and is being used in road paving work.

Bald Knob, Ark. The Thorgmartin and Son Construction Co. is running its rock crushing machinery in the old Missouri Pacific quarry night and day. The material needed to surface State Highway 16, 21,000 yd., is being handled at the rate of 400 cu. yd. daily.

Sand and Gravel

Moundsville Sand ..., Moundsville, W. Va., is furnishing the gravel and sand for the Marshall County unit of State Highway No. 2.

Concho Sand and Gravel Co., Pawhuska, Okla., is installing new crushing equipment at its plant here.

Baldwin Sand and Gravel Co., Inc., Elmira, N. Y., has changed its name to the Latta Brook Sand and Gravel Corp.

Ross Island Sand and Gravel Co., Portland, Ore., incurred damages estimated at nearly $18,000 when a fire partially destroyed the company's river tugs "Geo. W. Bates" and "Relief."

Black Rock, Ark. A new gravel plant is being built here by Roy Hudson. It is expected that the plant will be ready to operate within a few weeks.

Columbia Sand and Gravel Co., Washington, D. C., has received contract for 24,000 tons of rip rap stone to cost $59,520 from the United States Engineering Office.

Camargo Gravel and Sand Co., Woodward, Okla., is running day and night shifts in order to handle the order for 300 cars of material to be shipped to the Panhandle district, according to L. S. Fisher, president of the company.

People's Sand and Supply Co., Wichita, Kan., has been awarded contract for 10,000 cu. yd. of sand for the new Federal Building. Improvements made at the plant recently, include the installation of a new pump.

Arundel Corp., Baltimore, Md., has awarded general contract to M. A. Long Co., Baltimore, for a one-story machine shop, 50x400 ft. at Fairfield, Md., to replace the unit which was recently destroyed by fire. The addition is to cost over $60,000 with equipment.

Lyman-Richey Sand and Gravel Co., Omaha, Neb., reports that last year's record of 10,000 cars loaded by its sand and gravel pits northwest of Plattsmouth, Neb., will be exceeded this year, and that the present loadings are running from 90 to 135 cars per day, most of which is going to Iowa paving projects.

Harvey Sand and Gravel Co., Knoxville, Ia., with a bid of $10,842.80, was awarded the contract for the graveling of over five miles in Mahaska county trunk road 1, in West Des Moines township, and for the replenishing of gravel on county trunk road B near Barnes City, and the same road near Lacey.

Carolina Gravel Corp., Hagood, S. C., recently organized by G. E. Walker and associates, is planning the erection of a new sand and gravel plant, including the installation of mining, conveying, loading and other equipment. The company is also planning the development of similar properties at Horatio, S. C.

C. Rees, Nanticoke, Penn., has taken over the sand and gravel operation formerly operated by Isaac Saba at Hunlock Creek, Penn. The plant will be operated under the name of the Hunlock Sand and Gravel Co., with office at 9 Lloyd Lane, Wilkes-Barre, Penn. The company also manufactures concrete blocks at Wilkes-Barre.

Cement

Powell Lime and Cement Co., Memphis, Tenn., has purchased the former plant of the Raleigh Sand and Gravel Co. on Cedar Road, Memphis, and will remodel the plant and install new equipment.

Alpha Portland Cement Co., Easton, Penn., was awarded $20,000 by the United States court of claims in its tax refund dispute with the treasury department.

Huron Portland Cement Co., Detroit, Mich., has awarded general contract to the Burrell Engineering and Construction Co., Chicago, Ill., for a three-story addition to its plant for storage and distribution, to cost close to $45,000 with equipment.

Lone Star Cement Co. Louisiana, New Orleans, La., has temporarily suspended production at its plant, according to reports. Only the shipping department will be operated for the present. The Lone Star plant at Bonner Springs, Kan., also suspended operations in all departments except the packing room during the month of October.

Superior Portland Cement, Inc., Seattle, Wash. About 225,000 tons of lime rock was brought down at the Concrete, Wash., quarry of the company by what is said to be the largest dynamite blast ever set off in the Pacific Northwest. A total of 54,000 lb. of dynamite was used for the blasting, and this was loaded into 15 holes, each 200 ft. deep.

Miscellaneous Rock Products

William R. Ridgely, Wyoming, Penn., owner and operator of a sand and gravel pit, is also manufacturing concrete blocks.

The Turmsite Silica Plant near Fowler, Kan., was recently destroyed by fire. The damage was estimated at $55,000. Origin of the fire was not determined.

Universal Gypsum and Lime Co., Chicago, Ill., held a one-day sales conference at Fort Dodge, Ia., for its salesmen from the northwest division. A general discussion of sales problems made up the program with W. S. Brown, sales manager of the northwest division, in charge.

Personals

W. J. Coles, M. I. E. E., director of Edgar Allen and Co., Ltd., Sheffield, England, was a recent visitor at the offices of ROCK PRODUCTS.

E. W. Balding of the New York Belting and Packing Co., New York City, sailed September 26 to vacation in Europe.

Ralph D. Morrison has joined the Thompson and Lichtner Co., Inc., Boston, Mass., in an engineering capacity.

Mark E. Smith, secretary-treasurer of the Kelley Sand and Materials Co., Burlington, Wis., and Miss Mary McDonald were married on October 11 at Burlington.

Alan I. Bodycomb, A. A. C. I., chemist at the plant of The Peninsula Lime and Fertiliser Co., Melbourne, Australia, visited ROCK PRODUCTS offices recently.

C. Ward Keif, structural engineer of the Portland Cement Association, addressed the members of the Young Men's Business Club of Tacoma, Wash., describing new developments in concrete work.

Paul C. Hodges, vice-president of the Marble Cliff Quarries Co., Columbus, Ohio, is general chairman of the Ohio Valley Shippers' Board. Output increases of many plants in the Ohio valley region were reported at the 26th meeting of the board held recently.

D. M. Fullington of the Lehigh Portland Cement Co. exhibited eight reels of motion pictures, showing how cement is used, at a conference of lumbermen and building material dealers recently held at the Franciscan hotel in Albuquerque, N. M.

B. L. Donahue

B. L. Donahue has been named manager of the Buffalo district office of Cutler-Hammer, Inc., Milwaukee, Wis., succeeding B. A. Hansen, who resigned. Mr. Donahue is widely known in the electrical field, having been connected with the Pittsburgh branch office of the company for the past eight years.

J. T. Conners, who was district manager for the Thew Shovel Co. in Detroit for a number of years, is now with the American Hoist and Derrick Co., St. Paul, Minn. Mr. Conners will have charge of "American Gopher" sales in the field.

Miles C. Smith, manager of sales promotion of the Stoody Co., Whittier, Calif., presented a paper at the recent annual convention of the American Society for Steel Treating, held in Chicago, on "Relationship Between Welded-on Overlays and Heat Treatment."

Obituaries

M. J. Scanlon, vice-president of the Trinity Portland Cement Co., Dallas, Tex., as well as vice-president of the Brooks-Scanlon Lumber Co. and an officer of a score of other lumber, business and financial companies, passed away recently.

Walter A. Heath, assistant general superintendent of the Buffington, Ind., plant of the Universal Atlas Cement Co. since 1922, died, October 5, after a two months' illness. He was 67 years old. Mr. Heath had been with the Universal Atlas company since 1904, serving successively as shop foreman, construction foreman, mechanical foreman, master mechanic, and assistant general superintendent in charge of mechanical operation.